

Pages 3-13, which contain a history of the Pharmacopoeias of the various nations, may be of interest, so far as the bibliography is concerned.

Ch Rice.

[Introductory Paper in the series "THE STUDY OF PHARMACY," published in the Pharmaceutical Era (weekly) during 1895. Supplied to all Subscribers.]

THE STUDY OF PHARMACY

CONSISTING OF A
SERIES OF ESSAYS, BY
RECOGNIZED AUTHORITIES
COVERING THE ESSENTIAL
BRANCHES OF A
PHARMACEUTICAL
EDUCATION.

522

LIBRARY

(Copyright, 1895. By D. O. Haynes & Co. All rights reserved.)

INTRODUCTION.

By Charles Rice, Ph. D.

I. THE GROWTH OF PHARMACY IN THE UNITED STATES.

It would be an interesting task, and one which would undoubtedly bring to light many curious and noteworthy facts regarding the progress and development of medical and pharmaceutical practice in this country, if some competent person, having the necessary experience, leisure and attachment to the subject, were to examine the older literature relating to this country, and search through the public archives, official and private records and correspondence as far as accessible, as well as the files of newspapers and professional periodicals, to extract therefrom materials for a history of American pharmacy. It is true that, on the whole, the value of such an account, particularly for the period antedating this century, would be purely historical. Yet, the pharmaceutical art, crude as it was in those days, forms a link in the chain of human occupations in which the gradual progress of knowledge, based upon experimentation and a close observance of nature, can be distinctly traced. Indeed, it may be asserted, without fear of contradiction, that the training of a pharmacist, in the days when modern chemistry may be said to have been born—in the time of Priestley, Lavoisier, etc.—more than anything else, facilitated a deeper penetration into the secrets of nature. It is to be hoped that the researches spoken of above will some time be made, but the Bancroft of American pharmacy has not yet been born; or, if born, has not yet revealed himself.

Since the time when New York became an English colony (1664), English methods of administration and English customs became more and more prevalent. Concerning the practice of medicine and pharmacy it may be said that it differed from that of the mother country only in being more lax and unrestricted, and standing on a somewhat lower level, at least in the earlier times, when the two professions were usually combined in one and the same person. This condition of affairs prevailed up

to within this century, and, though in a modified manner, even exists at the present time. On the Continent of Europe the profession of medicine had long been divorced from that of pharmacy by stringent laws. In England, however, there existed a class of persons, styled apothecaries, who were legally empowered to exercise certain medical or surgical functions, more particularly after the founding of Apothecaries' Hall. The first medical act in England was passed in 1511, under the title, "An Act for the Apportioning of Physicians and Surgeons." It vested the faculty of medicine in one body of men, who practiced medicine, surgery and pharmacy. The physicians' assistants were styled apothecaries, and they, gradually acquiring information respecting the properties of drugs, began to transact business on their own account. (See the "Historical Sketch of the Progress of Pharmacy in Great Britain," by Theophilus Redwood; 8vo., London, 1880.) Since we inherited our medical institutions from England, the confusion of interests which prevailed there has, in some measure, descended to us, and the race of apothecaries, in the English sense, kept on flourishing in this country up to within the first half of this century at least. The absence of any laws to the contrary drove many graduates of medicine, who were unsuccessful in a purely medical or surgical practice, into the ranks of the pharmacists, and this, again, induced many of the latter to obtain a medical degree in order to enable them to meet the competition successfully. This has been the case in the past, but applies also to the present time, although the best representatives of both professions—and they comprise the great majority—discountenance this amalgamation of the two interests and brand it as unethical.

Since the beginning of this century three principal periods may be distinguished, each of which was inaugurated by some important occurrence or new departure. The first period is marked by the establishment of a National Pharmacopoeia in 1820, and of the first pharmaceutical schools; the second by the organization of the American Pharmaceutical Association in 1852; and the third by the creation of Boards of Pharmacy since 1870.

THE PHARMACOPŒIA AND SCHOOLS OF PHARMACY.

After the first Pharmacopoeia of the United States of America had appeared (in 1820), it became more and more evident that an intelligent use of it, and a faithful adherence to its requirements, could be brought about only by educating the profession up to a higher standard. At the same time, the establishment of the national code rendered it highly desirable to bring about an improvement in the quality of drugs and medicines sold, by placing guards at the several points of entry, whose duty it should be to bar out inferior articles. Mainly with a view to the first object, but, also, distinctly recognizing the second, the pharmacists of Philadelphia founded a school (the Philadelphia College of Pharmacy) in 1821, and their example was followed by the pharmacists of New York in 1829. It is not necessary to follow the fortunes of these institutions here. This much may, however, be said, that they were important factors in creating a deeper interest in the vital questions pertaining to a success in the profession, and, though each of them, in its early days, had its periods of stagnation, yet each had enough earnest supporters to keep interest in its progress alive.

Several other colleges of pharmacy, viz., those at Baltimore, Boston and Cincinnati, were started during this period, but did not become permanent teaching institutions until 1856, 1867 and 1871, respectively. At the present time, there are some twenty-four colleges and some twenty schools of pharmacy in actual operation, with more or less success. Some of them are independent corporations; others are departments of medical colleges or of universities. Together, they send forth annually over one thousand graduates, and the advent of this young blood is from year to year more distinctly felt in the ranks of the profession. Not long after the organization of the New York College, a movement was started, which was participated in by the Philadelphia College, to have a system of drug inspection established by Government at the several ports of entry. This movement was successful, and resulted in a notable improvement in the quality of imported drugs and chemicals. The methods of inspection, how-

ever, suffered from the drawback that they were not uniform; moreover, the several examiners did not agree in their views regarding the standards to be followed as a basis. As the New York drug market, where the imports were largest, suffered considerably from the uncertainty of the public analysts' results, the College of Pharmacy of the City of New York issued a call, in 1851, addressed to other colleges of pharmacy, requesting them to appoint, each, three delegates, to meet in convention in New York city, for the purpose of securing uniformity in the standards used by the several examiners of drugs and medicines at the different ports of entry. At this convention delegates were present from the colleges of New York, Boston and Philadelphia. The delegates from the Maryland and Cincinnati colleges sent communications approving the object, but did not attend. At this meeting, the importance and value of concerted action on matters concerning the profession were so vividly illustrated that the members present decided to issue a call to all incorporated and unincorporated pharmaceutical schools and societies, as well as to individual pharmacists, to meet in convention at Philadelphia on Oct. 6, 1852, for the purpose of organizing a national association. At the appointed time this convention met and organized as the American Pharmaceutical Association, the creation of which marks a distinct epoch in American Pharmacy, as it proved to be a powerful lever in promoting the advancement and the raising the standard of the profession in all directions.

AMERICAN PHARMACEUTICAL ASSOCIATION.

At the very outset the association took steps to collect, from all parts of the country in which it had secured active members, statistics showing the number of pharmacists, the condition of the practice of medicine and pharmacy, the degree of professional education prevailing among the members of the profession, the standards and authorities followed, etc. Responses were submitted to the next convention. Some of these showed a lamentable state of affairs as existing in those days. Nothing better illustrates the great advance made since then than the following passages taken from the "Report of the Philadelphia College of Pharmacy, in answer to the request of the National Pharmaceutical Convention of 1852, regarding the pharmaceutical statistics of Pennsylvania" (signed by Edward Parrish, William Procter, Jr., and Ambrose Smith): "There is a great lack of pharmaceutical knowledge and skill throughout the State of Pennsylvania. Even in the cities and large towns there is a large proportion of unqualified apothecaries, but in the remote counties the ignorance to be found among those who deal in medicines is almost incredible. One of our correspondents reports that some of the drug dealers 'do not know the difference between morphia and strychnia,' and another that 'nineteen in twenty of those who deal in medicines never so much as heard of the Pharmacopoeia.' Although we believe these remarks apply to general dealers rather than to druggists

and apothecaries, yet we find in the practice of the latter, as reported, evidence of great deficiencies. About one-third of those heard from do not use official weights. The Dispensatory appears to be generally employed as a guide in practice. * * * One reason of the low state of pharmacy may be found in the abundant prevalence of quackery and irregular practice among physicians. Our information from various sources leads us to the conclusion that this evil is declining since the extension of county medical societies. In Pittsburg and Allegheny counties 'eclecticism, homoeopathy, hydropathy, etc., are on the decline.' In Lehigh County, where the 'infinitesimal system' was introduced twenty years ago, and in Northampton County, it has greatly fallen into discredit; and the same is becoming true of Armstrong, Blair, Indiana and Berks counties, while in a few localities it is still rampant. In Clarion County there are twenty quack doctors to five graduates, and one regular druggist in a population of 25,921 persons," etc. Regarding the city of Philadelphia the report, as might be expected, was more favorable. Reports from other sections of the country revealed in most cases similar conditions. It required a more than usual moral courage thus to lay bare the sores from which the profession was suffering. But this very courage, and the unservedness with which the existence of the evils was pointed out, more than anything else, aided in bringing about a change. From year to year a distinct improvement could be recognized, and a new generation has now grown up, which stands on a far higher level than that which preceded it.

As a natural consequence of the impetus thus given to the profession schools of pharmacy increased in number, and most of them could show an increased attendance from year to year. The attention of the association was, among other things, also directed toward an improvement in the method of apprenticeship, or the character of apprentices admitted to the profession. This subject has often been under discussion, and the necessity of requiring a higher standard of preliminary education is not only universally recognized, but also practically indorsed by many members. When it became clear that no legal measures could be secured to raise the standard of education of apprentices, the colleges of pharmacy came to the aid of the profession, some of them at first to their own financial disadvantage, by requiring applicants to subject themselves to a preliminary examination. This has been the means of keeping out, or weeding out, from the profession many a person who would have been no honor to it. Still, the colleges of pharmacy do not comprise among their students more than a moderate fraction of the beginners in pharmacy, and without further help the effects of their aid would not have been materially felt for many years. Fortunately, however, there arose circumstances which induced the Legislatures of many of the States to enact laws making the exercise of the profession of pharmacy conditional upon the possession of a certain amount of ex-

perience or knowledge, and creating Boards for the licensing of those who were found deserving of it.

BOARDS OF PHARMACY.

The creation of Boards of Pharmacy must be regarded as the beginning of the third epoch in the history of American Pharmacy. A few laws regarding the practice of pharmacy had been in existence previous to this period; thus one in Georgia since 1847, and some local laws in New York and Pennsylvania, but it was not until 1870 that the efforts to have more comprehensive laws enacted were successful. The first law establishing a Board of Pharmacy and regulating the sale of poisons, constructed upon a basis appropriate to existing conditions, was enacted in Rhode Island in 1870. Since then most of the States of the Union have passed similar laws, some of them more than one, each for distinct sections of a State. It would lead too far here to state their points of agreement or difference, or to go into other details. Most of these laws made some concessions to persons who were already established in regular business at the time when the respective acts went into effect, by granting licenses without examination. Others, again, made no exceptions. One of the notable consequences of this legislation has been this: that the study of pharmacy in its various branches is now pursued at home by hundreds of young men, who are unable to attend colleges of pharmacy, and who yet wish to obtain the knowledge requisite to pass the examination of the Boards of Pharmacy. It is probable that, in many cases, the passing of such an examination is the chief object, rather than the acquisition of a thorough knowledge. But even this is better than the total neglect of all chances of improvement which is likely to happen in the case of many young men who do not have a goal to gain under some difficulties.

Among the factors which have very materially contributed to the progress of pharmacy in modern times must be named, first, the Pharmacopoeia, as revised under the instructions of the Decennial Conventions of 1880 and 1890; second, the National Formulary, and third, the Pharmaceutical Press. Concerning the former two the reader is referred to the next following article. As to the pharmaceutical press, its service to the profession cannot be overestimated. It has disseminated knowledge and information everywhere, has brought about many reforms by timely criticism, has helped to ameliorate unfavorable conditions by suggesting remedies, and has brought the members of the profession closer together. For this reason it deserves the generous support of every one who is, even remotely, affiliated with pharmacy.

With the improvement in pharmaceutical education, and the gradual advent of a new generation of better equipped men in all branches of the profession new conditions have arisen which, in their turn, will again make higher demands upon the members. More stringent laws have been passed concerning the adulteration and sophistication of food and drugs. Since the pharmacopoeia now establishes distinct

standards of strength and purity, and since it is expected, that the pharmacist of the present day possess the knowledge requisite to verify or apply these standards, the laws have put a greater responsibility on him. It is to his own interest to act in harmony with these laws, not only by obeying them strictly himself, but also by seeing them enforced by others, as well as by contributing to their improvement.

It is not to be denied that the conditions surrounding the exercise of the profession of pharmacy at the present time are not as favorable as they have been in the past. Excessive and unrestricted competition, unfair business methods, dullness of trade, and other causes have seriously interfered with the prosperity of the pharmacist. Nevertheless, if he will keep abreast of the progress of his own profession, and, as far as possible, also of that of materia medica and therapeutics, and if he, moreover, keep in harmonious contact with the medical profession, he will continue to fill his place with benefit to himself, and to the approval of the community at large.

II. PHARMACOPŒIAS.

A Pharmacopœia (Greek: *φάρμακοποιία* Latin: *pharmacopœia* or *pharmacopœa*; German: *Pharmakopœie*; French: *pharmacopée*; Italian and Spanish: *farmacopea*, etc.), in the modern sense of the word, is a work published by some recognized authority for the purpose of securing uniformity in the kind, quality, composition and strength of the remedies used in the treatment of the sick. It may either be of a local character or apply to a whole country, or to some special service, department, or political division of a country. The term has also frequently been applied to works published by individuals or bodies without the official indorsement of some governmental or professional authority. The Greek word *φάρμακοποιία* is derived from *φάρμακον* (remedy, charm, etc.) and *ποιεῖν* (to make). It was used by Greek writers (for instance, by Diogenes Laërtius (third century A. D.), "De Vitis Philosophorum," VII., 64, 117) in the sense of "preparation of medicines." As the title of a book treating of this subject, it is probably not older than the beginning of the sixteenth century. Previous to this period, as well as for some time subsequently, certain other terms, such as *Antidotarium*, *Formularium*, *Dispensatorium*, etc., were used in place of it.

ANCIENT AND MÆDIEVAL PRECURSORS OF THE MODERN PHARMACOPŒIAS.

While the ancient nations did not possess any works exactly corresponding to our modern pharmacopœias, yet the gradually accumulating mass of facts relating to the collection, preparation and use of drugs and medicines resulted in the production of numerous works treating at least incidentally of these subjects. Many of these works are known to us only by title or through statements of other writers. Of those which have come down to us we shall,

in the following account, mention only the more important ones, particularly those which have exerted some influence upon the practice of medicine and the art of pharmacy in modern times.

ASSYRIA AND BABYLONIA.—Although a very large number of the ancient literary documents of these countries have so far been discovered and become accessible, yet there is no evidence that the medical art, in those remote times, had advanced beyond the stage of superstition, the use of charms and incantations and a crude knowledge of some simple domestic remedies. There is no doubt that Egypt, and subsequently Greece, were the countries from which the progress of medical knowledge gradually spread to others.

EGYPT has furnished us the oldest existing documents containing formulas and directions for the preparation of medicines. The oldest known is the Papyrus Ebers (discovered by Prof. Ebers in 1872), dating from the year 1552 B. C. (see *Medical Record*, XI. (1876), 247-251). This remarkable work, written on papyrus in hieratic characters, shows that the knowledge of medicine, surgery and materia medica had attained, already at that early period, a condition of development which could have been brought about only by the records of experiments carried on through many previous centuries. Much stress was laid on the proper diagnosing of certain diseases from symptoms, but the knowledge of anatomy and physiology possessed by the physicians of that period was too crude to throw the proper light on the real nature of the diseases. The Papyrus Ebers contains a large number of formulas of compounds, often in form of regular galenic recipes, with signs and terms expressing definite weights and measures, precisely as is customary at the present day. Among the medicinal, or rather sanitary, agents employed by the ancient Egyptians, fumigations occupied so important a place that special sections are devoted to them in the medical papyri. The Egyptian texts use the word "kipu" or "kipi" to designate "fumigation" or "to fumigate." This word is given as *κῑπῑ* by Plutarch ("Isis et Osiris," 81), but he mistook it for a medicine to be taken internally. According to the Papyrus Ebers, the "kipi" was composed of numerous ingredients, which, when burned, diffused an agreeable odor, supposed to ward off disease or contagion, and when chewed, perfumed the breath. A translation of the Papyrus Ebers was attempted by H. Joachim ("Papyrus Ebers: Das älteste Buch über Heilkunde." Berlin, 1890). On the weights and measures mentioned in the work, and also on diseases of the eye, see Ebers, "Die Maasse und das Kapitel über die Augenkrankheiten." Leipzig, 1889. Compare also Brugsch, H., "Die Aegyptologie." Leipzig, 1889.

Of equally great interest, though a few centuries younger, is the medical papyrus of Berlin (published by H. Brugsch in "Recueil de Monuments égyptiens," I., 85-107), which was written about 1350 B. C. This also contains a great number of formulas with

exact statements as to ingredients, weights and measures, all, however, in a condensed, laconic form, showing that it was written for persons accustomed to an old-established system. These formulas comprise internal and external remedies, among which are embrocations, cataplasms, salves, plasters, enemata, potions, decoctions, etc. The remedies themselves, in both of the before-mentioned papyri, are derived from the three kingdoms of nature, consisting of human and other milk, human urine, the faeces, bile, blood, etc., of various animals; honey, wine, vinegar, certain gums and resins, various minerals, etc.

In addition to these and some other written documents there also existed formularies sculptured in stone. Such a formulary or pharmacopœia was discovered by Prof. Dümichen upon the walls of a regular pharmaceutical laboratory, built during the Graeco-Roman period, in the temple of Edfu (see "Zeitschrift f. ägypt. Sprache," etc., 1865, p. 59; 1879, p. 97).

INDIA.—The oldest literature of the Hindus, which was reduced to writing at a much later period than that of Egypt, being originally transmitted by oral tradition only, might be supposed to contain at least fragments of a science of medicine or pharmacy existing in ancient times. An examination of the Vedic texts, however, and of their corresponding sacrificial or exegetical derivatives, the Brahmanas and Sûtras reveals only a very meagre and crude knowledge, disease being usually ascribed to supernatural causes and its cure to the efficacy of charms and incantations. Yet there is no lack of Hindu medical works which have come down to us. At one time these were believed to be very ancient, but this has long been shown to be a mistake. The most celebrated works of this kind are those which are ascribed to Sûgruta and to Charaka, of neither of whom do we possess any historical data. Concerning Sûgruta we know that his work must have been known to Sānâq, the author of the "Book of Poisons" (*Zeitschrift d. Deutsch. Morgenlând. Ges.*, Vol. 34, p. 465, etc.), who wrote in the beginning of the tenth century. He is also quoted by Rhazes (ar-Râzî), who died 932 A. D. (*ibid.*, 545). Hence he could not have flourished later than the ninth century. Of Charaka we know that his work was translated from the Persian into Arabic by Manakah, a Hindoo physician at the court of Hārūn ar-Rashid (who reigned 786-809 A. D.). He was also known to Rhazes, and is quoted by Serapion and Albīrūnī (eleventh century). We have reason to know that the Sanskrit texts of these authors, such as we now possess them, are not the original works, but that they are largely diluted with additional and often trivial matters. It is highly probable, though not yet conclusively proven, that much of the medical knowledge of the Hindus came to them from the West, probably from Greece. Haas even suggested that the name Sûgruta was originally nothing else but that of the Greek Hippocrates (*Zeitsch. d. D. Morg. Ges.*, Vol. 30, 617;

Vol. 31, 647). Both Suçruta's and Charaka's works have been repeatedly published (Suçruta: Calcutta, 1835-36; 1873. Charaka: Calcutta, 1868 (part); 1877 (whole); Bombay, 1877 (part), and more or less completely translated: Suçruta, by Hessler (Erlangen, 1844-50; unreliable); A. M. Kunte (Bombay, 1877, etc., in part); U. Ch. Dutt (Calcutta, 1883; in part). Charaka, by A. Chandra Kaviratna, Calcutta, 1890, etc.; nine parts have appeared so far, comprising about one-sixth of the work). These works contain numerous formulas and directions for preparing medicines, but many of them are inane and irrational or are obscured by the presence of ingredients (plants, minerals, etc.), which cannot be identified with certainty. Among later medical works, also containing many formulas and remedies, the most important are the Ashtāṅgahridaya by Vāgbhata, and the Bhāvaprakāṣa by Bhāva (the latter the main source of Wise's "Commentary on the Hindu System of Medicine" (London, 1860), both of which are only a few centuries old. Regular treatises on pharmacy are not numerous. The following deserve mention: The Prayogāmṛita ("Nectar of Remedies"), by Vaidyachintāman: the Dhāturaṇmālā ("Pearlstring of Minerals"), by Devadatta; the Rasarājajalākṣmī ("Virtue of Mercury"), by Rāmeçvara, and the Rasendrachintāmanī ("Jewel of Mercury"), by Rāmachandra. Treatises on materia medica, or glossaries of simples are more common. The most extensive of these is the Nighanturāja, by Narahari of Cashmeer, being a dictionary of the products of nature, etc., with synonyms, so far only existing in manuscript. Another smaller, but useful, work is the Madanavinoda of Madanapāla, composed about 1300 A. D. (published at Calcutta, 1875).

GREECE AND GREEK COLONIES.

The first prominent historical personage appearing upon the stage of Greek medicine, the influence of whose teachings is, in some directions, felt even at the present day, was Hippocrates (about 467-377 B. C.). We know of many men before his time who had acquired more or less fame as physicians, and, indeed, the advanced knowledge of Hippocrates presupposes a course of development of the medical art extending through centuries before him, though possibly not in Greece. But with him a new era was inaugurated. The works composed by, or attributed to him, contain numerous directions for the preparation of certain medicines, but there is none exclusively devoted to this subject. As we now possess his works they came to us through the hands of his successors, who put them together and edited them long after his death, and finally they were revised by the official diaskeuasts at the Alexandrian library. There is no evidence that the pharmaceutical art was in a forward state of development at that time in Greece. The "pharmakopolae" of those times sold their wares on the public market, dealing in all kinds of simples, charms, amulets, cosmetics, aphrodisiacs, antidotes, burning glasses (for lighting

fires), etc. There was also a class of pharmakoi or pharmakides *φαρμακοί-φαρμακίδες* medical charlatans who pretended to be able to cure by means of simples or by sympathy. It was only after the teachings of Hippocrates and of his school became disseminated through the Greek-speaking countries that more attention was paid to materia medica and the art of preparing medicines. The study of plants, even aside from their utility in medicine, made also considerable progress at about that period, as is amply shown by the works of Theophrastus of Eresus (392 or 372-285 B. C.). Among Hippocrates' successors the following may be mentioned: Diocles of Karystus (about 350 B. C.), who wrote a work on "root gathering" *ρίζοτομικόν* and one on poisons (*περί θανασιών φαρμάκων*); Demetrius of Apamea (about 250 B. C.), who wrote "The Drug Seller" (*φαρμακοπώλης*); Andreas of Karystus (about 225 B. C.), who wrote "The Medicine Chest" (*νάρθηξ*); Nikander of Klaros (about 200-130), who wrote on antidotes to poison (*ἀλεξιφάρμακα*) and on dangerous animals and remedies against them (*θηριακά*), from which the name of the latter "Theriak" is derived). A similar work was written by Mithridates of Pontus (124-64 B. C.), who originated the complex confection known under the name of Mithridatium, which formed the basis of the theriac of Andromachus. The latter, born in Creta, was Nero's court physician and wrote, about 60 A. D., a poem on the preparation and virtues of theriac. This compound played an important rôle for many centuries subsequently, and even at the present day still haunts more than one pharmacopeia in a more or less modified form. At about the same time (65 A. D.) Serapion of Ephesus (or Democertes) composed various poems on certain remedies, among them also one on theriac. This compound, when prepared according to his directions, was subsequently known as "Confectio Damocratis."

Of paramount importance for the development and more rational study of materia medica was Pedanius Dioscorides of Anazarba, near Tarsus, in Cilicia, whose work *ἱατρικά* ("Materials," written about 78 A. D.), in five books, is a most valuable cyclopedia of simples and became the chief source of knowledge and reference for pharmacological writers down to the fifteenth or sixteenth century. (Best edition by C. Sprengel, 2 vols., Leipzig, 1829-30. An elaborate commentary on the work was composed by Matthioli, which was first published, in Latin, in Venice, 1554, and was many times reprinted, and also translated).

No author need now be mentioned until the time of Claudius Galenus of Pergamum, in Mysia (131-about 210 A. D.). In the numerous writings, partly genuine and partly spurious, which bear this great physician's name, there occur many formulas which were handed down, some even to modern times, as standard recipes. Two of his works treat especially of the composition of medicines, one of them more particularly with reference

to their place of application and effect *περί συνθέσεως φαρμάκων κατὰ τόπους* and the other with reference to their classes or composition (*κατὰ γέννη*). The last-named work, in seven books, is that which gives the formulas of a large number of compound medicines or "Galenicals." It is to be noted, however, that in his own methods of treatment he seems to have preferred the more simple remedies. On the materia medica of Galen see Israelson, L., "Die Materia Medica des Klaudios Galenos." Jurjew (or Dorpat), 1894.

The adulteration and sophistication of medicines is probably nearly as old as their use itself. Several ancient authors expressly treat of this subject. Galen himself, in his youth, had been taught how to imitate or sophisticate certain valuable drugs. And in his riper years he undertook journeys to Cyprus, Palestine and Lemnos in order to procure certain drugs in a genuine state. Special care is said to have been exercised to procure genuine drugs for the use of the Roman emperors and their families. Medicines from Syria, Egypt, the Pontus, Cappadocia, Spain and Africa were procured or collected under the supervision of the governors of the several provinces. In Creta there were special imperial officials who packed the indigenous remedies, marked them with their name and place of growth and sent them to the imperial storehouse, as well as to the public market in Rome. Galen laid much stress on the importance of personal familiarity, on the part of a physician, with the remedies he uses—and this is, if anything, even more important at the present day. In one of his works he expresses a regret that the disciples of the medical art had begun to use pictures of the plants used in medicine instead of collecting them themselves, and thus becoming more familiar with them. Incidentally it may be mentioned here that botanical illustrations are found in much earlier times. Thus, Cratenas is reported to have composed a work on materia medica with colored illustrations, which he dedicated to Mithridates, king of Pontus (124-64 B. C.).

Of later writers the more important are: Aëtius of Amida in Mesopotamia (sixth century), who gives numerous formulas for plasters, salves, etc.; Alexander of Tralles in Lydia (525-604 A. D.), and Paulus of Aegina (seventh century), both of whom likewise give many formulas in their writings. Passing now over several centuries, the dreariest portion in the history of literature, we find no author worthy of mention, until the first half of the twelfth century, when Nicolaus Praepositus of Salerno compiled an "Antidotarium," containing about 150 complex formulas. This acquired great fame and became, together with Mesue's and some other minor works, the source of the formularies of later times. In some of the Italian states the two works were even ordered to be the official guide of the apothecaries. In the second half of the thirteenth century Nicolaus Myrepsus of Alexandria com-

piled an encyclopedic "Antidotarium" (*δυναμειών*), containing not less than 2,656 formulas in forty-eight chapters. This work was written in Greek, but only a Latin translation has been published (first edition, Basle, 1549). Yet this work, subsequently called "Antidotarium Magnum," to distinguish it from the shorter work of Nicolaus Praepositus, which was entitled "Antidotarium Parvum," never received much recognition.

ROME.—The oldest Roman author from whom formulas for domestic remedies have come down to us is M. Porcius Cato (234-149 B. C.), who interweaves them, here and there, in his treatise on agriculture. Medical works proper are not met with in Roman literature until much later, because the medical art was exercised in Rome exclusively by foreigners, and those who exercised it were, moreover, held in but little esteem. The same may be said of the dealers in simples and other medicines, who were of the lowest class. They bore a variety of names. As early as the time of Cato we read of *rhizotomi* ("root cutters"), *unguentarii* or *myropolae* ("dealers in salves," "dealers in perfumed oils"), *pharmacopolae* ("medicine or charm sellers"), *thuriarii* ("incense sellers"), *pharmacopoei* ("medicine or charm makers"), and even *pantopolae* or *katholikoi* ("dealers in all"). In Galen's time the *pharmacopolae* also practiced bandaging and hawked about their remedies, put up in various kinds of vessels bearing labels giving the name of the remedy and of the inventor, as well as directions for use—just as is done in our days. The owners of stalls were called *seplasiarii*, after the name of a street in Capua where they first established themselves in permanent domiciles. The spice dealers (*aromatarii*) at that time formed a distinct class. Allied to them were the *pigmentarii*, who dealt in dyes (hence the name), perfumes, salves and wine, and who also embalmed the dead. While the practice of pharmacy in those days was yet in a crude and undeveloped state, more attention was paid to *materia medica*, as may be seen from the older authors (Theophrastus, etc.), and particularly from the great work on natural history by C. Plinius Secundus, the elder (23-79 A. D.). The first literary production specially relating to compound medicines and, in fact, constituting a formulary, is the work of Scribonius Largus (first century A. D.), "Compositiones," written in homely Latin, but of importance for the history of therapeutics of that period. This work contains, among other things, the first correct description of the method of obtaining opium (XXII: "Ex lacte ipso silvatici papaveris caput, non ex succo foliorum ejus, ut pigmentarii institores ejus compendii causa faciunt"—from the very milksap itself of the heads of the wild poppy, not from the juice of its leaves, such as the spice and drug peddlers prepare it to save labor). Some valuable works of other authors, dating from about this period and refer-

ring to our subject, are lost. We might, however, mention Rufus of Ephesus (first century), whose treatise on cathartics was the source of various formulas subsequently held in great esteem. When the practice of medicine had become more respected, particularly under the empire, writers on medical subjects in Rome preferred to use Greek, which accounts for the scarcity of medical works in Latin.

MOHAMMEDAN COUNTRIES.—With the gradual decline of the Roman empire, culture and science tended towards Constantinople, but so far as medical science is concerned, no progress was made, since it had practically become an axiom to follow the teachings of Hippocrates and Galen. The advent of the Arabs, however, infused new life into the torpid condition of medicine and other sciences. Under them the art of the apothecary first assumed a definite character, official regulations being established at Bagdad, and in some other places, for the exercise of his profession. These regulations related to the quality as well as the prices of medicines, and prescribed which of the remedies mentioned in the formularies of that period were to be kept on hand by the apothecaries (who were then first called *zandālāni*, or "sandalwood dealers") for instant use. These features were subsequently copied by western nations.

At the end of the ninth century Shābūr ben Sahl wrote a sort of dispensatory under the title "Ibdāl" ("exchange," "quid pro quo"), also called "Agrabādin" supposed to be derived from the Greek word *ἀκριβεια*, "thoroughness," often corrupted to "Krabadin" or "Grabaddin," and about the middle of the twelfth century Abū'l Hassan Hibet-Allah ibn Talmīd composed a similar work, which was much used by Arabic apothecaries. The most important work, however, is that composed by the younger Mesue (according to Leo Africanus, Māsūyah el-Mārdīnī, that is, of Maridīn, on the Euphrates, reported to have died in 1015 A. D. Others doubt whether he ever really existed and believe that some Latin-writing physician of the eleventh or twelfth century assumed the name; see Choulant, "Handbuch d. Bücherkunde f. d. ältere Medicin," Leipzig, 1841, 351), which is preserved to us only in Latin, together with two other small works of the same author. Mesue's "Antidotarium, seu Grabaddin Medicaminum Compositorum," in conjunction with the "Antidotarium Parvum" of Nicolaus Praepositus, remained for a long time the chief canon of pharmacy. It contains a large number of formulas arranged in twelve chapters, each treating of a different form or class of remedies (first edition, Venice, 1471; and nine more Latin editions, as well as four Italian translations before the year 1500; many editions subsequently).

The writings of Avicenna (Abū 'Alī el-Hosēn Ben Abdallah ibn Sīnā, 978-1036 A. D.), the most celebrated of all Arabic physicians, particularly the second book ("fen") of his "Kanūn," also

contain many formulas which were incorporated in subsequent collections.

Other writers whose works furnished more or less contributions in this direction were Ibn Wāfīd el-Lachmī (about 1050 A. D.), called Albenguefid in mediaeval literature, whose work on simples has been published only in Latin translation. Serapion the younger (supposed to be the pseudonym of a non-Mohammedan author, perhaps of the twelfth century), wrote a similar work, which was much more esteemed and made use of than those of the two preceding.

The most important Arabic writer on *materia medica* is Ibn Baitār (about 1197-1248). His work on simples and foods, based on the works of Greek, Arabian, Persian and Syrian writers and on his own observations, is a perfect storehouse of information and has exerted much influence upon the development of therapeutics and pharmacy among his countrymen. The Arabic text was published at Cairo in 1874. Best translation, with commentary, by L. Leclerc, in Vols. 23, 25 and 26 of "Notices et Extraits des Manuscrits de la Bibliothèque Nationale" (4to, Paris, 1877-83).

In connection with the Arabic writers may be mentioned the only Persian author of a work on *materia medica*, based upon Greek, Arabic and Indian sources, namely, Abū Mansūr Mowaffaq ben Alī al-Hirawī (often simply quoted as Alherwī), who lived in the ninth century. His work was published in Persian by Seligmann (8vo, Vienna, 1859). A German translation by Abdul-Chalig Achundow appeared in Vol. III. (1893) of "Historische Studien aus d. pharmakolog. Institut, Dorpat" (also separately, 8vo, Halle, 1893).

MEDIAEVAL EUROPE.—Although apothecaries established themselves as early as the thirteenth century in various cities of Germany and France, yet it was customary, until about the beginning of the fifteenth century, for the countries situated to the north of the Alps to procure most of the complex preparations from Italy, where the pharmaceutical art was in a much more flourishing condition. The chief reason for this was, no doubt, the difficulty of procuring and transporting the numerous, often bulky and sometimes rare and costly, crude materials. When, however, the printing press rapidly multiplied copies of the most renowned formularies, particularly of those of Mesue and Nicolaus Praepositus, and traffic across the Alps became more regular and easy, the importation of ready-made preparations from Italy gradually diminished, to the material advantage of the development of the pharmaceutical art in the countries north of the Alps. Among the works printed at the end of the fifteenth and the beginning of the sixteenth century which served as formularies or pharmacopoeias, besides the Antidotaria of Mesue and Nicolaus Praepositus, were the following: "Compendium Aromatorium," by Saladinus Asculanus (first edition, Bologna, 1488), in which much attention was paid to the de-

scription of crude drugs and their preservation; "Luminare Majus," by Johannes Jacobus de Manliis de Boscho (first dated edition, Venice, 1490), a highly esteemed dispensatory. A counterpart of this is the "Luminare Minus" of Quiricus de Augustis de Torthona (first edition, Venice, 1497). The "Antidotarium Florentinum" (Ricettario Fiorentino), of which the first edition appeared in 1498, is the first formulary or pharmacopoeia issued by some public authority, in this case by the Senate of the University of Florence.

III. HISTORY OF PHARMACOPŒIAS.

An exhaustive historical and bibliographical account of all the pharmacopœias ever published would occupy many pages, but much of it would be of no practical benefit at the present day. In the following an attempt is made to put on record as much detail regarding the pharmacopœias of the different countries as is believed to be of a more permanent historical or bibliographical value. The list comprises all the important countries of the world, even those which possess no pharmacopœia of their own. In the case of the latter, wherever it was possible, the work or works generally recognized as standards are indicated.

In many European countries special military pharmacopœias have, from time to time, been issued. These are mentioned only casually. Among the earlier pharmacopœias there are many which were more of a local character, being issued for use in certain cities or small territories. These could not be excluded, as most of these localities were autonomous in medical and pharmaceutical matters at the time. Many of the pharmacopœias below mentioned were reprinted, sometimes repeatedly, between two revisions, and in many cases with the year of reissue on the title page. No attention has been paid to these, as a rule. To save space the word "pharmacopœia" has, in many places, been abbreviated to "Ph." or "Pharm.," and the sign -| is added after certain dates to indicate that further editions or reprints appeared subsequently.

ARGENTINE REPUBLIC.—Several attempts have been made to prepare a national pharmacopœia, the last commission being appointed in 1892, but up to the present time no progress has been made. The "Farmacopœia del Pais" is mentioned in certain laws, but it is a mere fiction. Of foreign pharmacopœias, the French and Spanish are most in use.

AUSTRIA-HUNGARY.—In 1729 the Vienna Pharmaceutical Society published a pharmacopœia under the title "Dispensatorium Pharmaceuticum Austriaco-Viennense," which was repeatedly reprinted and revised. In 1739 appeared the "Dispensatorium Medico-Pharmaceuticum Pragense, and a revised edition of this was issued in 1749 under the title "Dispensatorium Pharmaceuticum Pragense Renovatum," which was made official until 1774, when the "Pharmacopœia Austriaco-Provincialis" was issued,

which had been prepared, under orders from the government, by Stoerck, Jacquin and Well. This work was several times revised, and also translated into German as well as Dutch, the Netherlands at that time forming a part of the Austrian empire. After the loss of the Dutch provinces a new departure was made, and the first pharmacopœia for Austria proper appeared in 1812 under the title "Pharmacopœia Austriaca." The subsequent editions (revisions) appeared in 1814 (II.), 1820 (III.), 1834 (IV.), this, being full of misprints, was reprinted in 1836, 1855 (V.), 1869 (VI.), 1889 (VII.). The last-named edition went into legal effect on Jan. 1, 1890. It is in Latin and contains 578 articles, forty-three more than the preceding.

A very good commentary on this work was published by Schneider and Vogl (the pharmaceutical part by A. Kremel), in 1889-90.

A Hungarian Pharm. was first published at Budapest, in 1871, under the title "Magyar Gyógyszerkönyv; Pharmacopœia Hungarica," in Latin and Hungarian on opposite sides. A supplement to this appeared in 1883, in which, among other things, a series of antiseptic dressings were, for the first time, made official. A second edition of the pharmacopœia appeared in 1888. This is very similar to the first. It contains 516 articles. A new edition is in course of preparation.

The first Croatian Pharmacopœia appeared in 1888 under the title "Hrvatsko-Slavonska Farmacopœia; Pharmacopœia Croatico-Slavonica" (Zagreb (= Agram), 1888). It contains 518 articles and is practically a duplicate of the Hungarian (II.), having the Slavonic and Latin texts on opposite sides.

BELGIUM.—Previous to the year 1815 the countries now known as Belgium, the Netherlands (or Holland) and some adjacent territories were subject to many political changes. Hence, although there was a "Pharmacopœia Belgica" published as early as 1659, this cannot be considered as a legitimate precursor of the modern work under this title. Various cities of the present kingdom of Belgium published pharmacopœias of their own, thus Antwerp ("Pharmacia Antverpenis," 1662; 1665; 1812); Brussels ("Pharmacopœia Bruxellensis," 1641, -|-); Ghent ("Antidotarium Gandavense," 1652, -|-). Liège ("Ph. Leodiensis," 1741). In 1774 the "Ph. Austriaco-Provincialis" was prescribed for use by the Austrian Government, but this was superseded in 1805 by the "Pharmacopœia Batava" (see under Netherlands). The first national pharmacopœia proper was published in 1823. In 1854 appeared a new edition under the title "Ph. Belgica Nova," and the last edition, which is officially designated as the "second," appeared in 1885. It contains 596 articles. The text is published in Latin and in French, in separate editions though the former is declared to be the official version. The titles are arranged alphabetically, and in nomenclature and general treatment of the subjects the work much resembles the French Codex. It has, however, avoid

ed the numerous errors or blunders with which the latter is contaminated.

BOLIVIA has no Pharm. of its own. The French and Spanish Ph. are mostly in use.

BRAZIL is still without a Pharm., though several attempts have been made to prepare one. Laws have, however, been made from time to time which prescribe what medicines are to be kept by pharmacists. Aside from the Spanish, Portuguese and French Pharm. and Dorvault's "L'Officine" (though this is becoming antiquated), Chernoviz's "Formulario, ou Guia Medica," and Langgaard's "Novo Formulario Medico e Pharmaceutico" (Rio de Janeiro) are in general use.

BRITISH EMPIRE.—Up to the year 1864 England, Scotland and Ireland possessed each its own Pharm. That for England was first published in 1618 by the Royal College of Physicians of London under the title "Pharm. Londinensis" (from the third edition under the title "Pharm. Collegii Regii Medicorum Londinensis"). It was several times reprinted with slight alterations, until 1650, when a revised edition was published. The succeeding revisions appeared in 1677 (III.); 1721 (IV.); in this edition vegetable drugs were for the first time defined as to origin; 1746 (V.; this edition shows a great advance over its predecessor; many of the old, complicated formulas were simplified and much useless material was eliminated); 1788 (VI.); 1809 (VII.; owing to the numerous mistakes contained in this, and the faulty nomenclature, both of which were severely criticised by Richard Phillips in the London Medical Review of 1810, a revised edition was issued in 1815); 1824 (VIII.); 1836 (IX.), and 1851 (X.). The edition of 1836 was partly prepared and officially translated by Richard Phillips. That of 1851 was wholly prepared by him. All the official editions were in Latin. The text of the London Pharm. was incorporated, mostly in translation, into many other works, such as commentaries or dispensatories, either written for it alone or for all the British Pharmacopœias together. Of the works of the latter class the most useful, which is even at the present day a valuable work of reference, was "Gray's Supplement to the Pharmacopœia," by Theophilus Redwood (third and last edition, London, 1857). The London Pharm. was translated into several foreign languages, even into Hindustani (Calcutta, 1824; lithographed; this seems to be very rare; the writer has never heard of another copy besides his own).

The first pharm. for Scotland was published by the Royal College of Physicians of Edinburgh in 1699 under the title "Pharmacopœia Collegii Regii Medicorum Edinburgensis." Fourteen editions, partly reprints, of this work appeared subsequently, the last edition (in English) being published in 1841.

The first pharm. for Ireland appeared in Dublin in 1806 under the title "Pharm. Collegii Medicorum Regis et Reginae in Hibernia." This was preceded by two pamphlets containing specimens of the text proposed to be issued, which appeared in 1794 and

1805. The Dublin pharm. was revised in 1826 and in 1850, the last-named being issued in English.

The disadvantage of having three different pharmacopoeias legalized in closely connected countries possessing one language was early recognized, but political considerations prevented a fusion, until the Medical Act of 1858 was passed, which provided for the compilation of a joint work. After much labor and delay the first "British Pharmacopoeia" appeared in 1864, but the work was found to suffer from numerous defects, chiefly due to the difficulty encountered in attempting to reconcile the differences in pharmaceutical and therapeutical usages existing in the three countries. It was, therefore, revised under the direction of the General Medical Council, by Rob. Warrington and Theoph. Redwood (practically the latter alone), and a new edition, issued in 1867. A supplement containing thirty-four additions appeared in 1874. A new revision, prepared by Professors Attfield, Redwood and Bentley, appeared in 1885. It contains 895 articles. This edition had the advantage of being able to profit from the preceding appearance of new editions of the pharmacopoeias of the United States, Germany and France, as well as from the large amount of pharmacopoeial literature which had accumulated during the preceding decade. Yet the work did not appear as satisfactory as was expected, more particularly to the pharmaceutical profession, because it showed some defects which were chiefly due to the limited experience on the part of the revisers with the actual requirements of the practical pharmacist and dispenser, and to their not being authorized to avail themselves of the advice and assistance of experts on such matters. In 1886, the General Council of Medical Education and Registration of the United Kingdom—generally designated by the shorter title "General Medical Council"—appointed Prof. John Attfield, one of the editors of the British Pharmacopoeia of 1885, as "Reporter on the Brit. Pharm. to the Medical Council," the office being intended to be permanent, for the purpose of gathering up, during each year, from the current literature whatever may have a bearing upon the Brit. Pharm., with a view to its revision and improvement. In accordance with this arrangement annual reports have been issued by Prof. Attfield since 1887. In 1888, the third reprint of the British Pharm. of 1885 was issued, and in December, 1890, appeared the first supplement under the title "Additions Made in 1890 to the British Pharm. of 1885," which contains forty-four articles. In the preparation of this "Addendum" (as it is usually called), the pharmaceutical profession of Great Britain was, for the first time, invited to participate, at least so far as to be asked to suggest desirable additions or improvements of existing formulas. At the present time preparations are being made to issue an Imperial British Pharmacopoeia, designed for use in the United Kingdom, as well as in the col-

onies and other British possessions, including the Dominion of Canada and India. In order to be adapted to so large a territory, comprising different nations, customs, climates, etc., it will have to be much more comprehensive than the present work, but it is likely to become an important factor toward the attainment of greater uniformity in the kinds, quality and strength of medicines used among civilized nations.

There are no commentaries to the British Pharm. or dispensaries corresponding to those in vogue in this country. The nearest approach to them is the "Companion to the British Pharmacopoeia," by Squire, which has been continued, by revised editions, up to the present time. Some years ago a work was announced to be in preparation containing the text of the British Pharm., with exhaustive commentary, but its issue appears to have been prevented by a threat of prosecution by the General Medical Council. At least it was so reported in a journal. It is possible that financial reasons were at the bottom of this, if it is true. But, if so, the interference was unwise and not conducive to the progress of either medicine or pharmacy. Some method could surely have been found by which the rights of the Medical Council, as authors of the pharmacopoeia, could have been protected, while at the same time a large amount of useful knowledge could have been disseminated by a work handled daily and hourly almost in every dispensing establishment and in physicians' offices.

In most of the British colonies and possessions the present British Pharm. is chiefly in use. In Canada, the United States Pharmacopoeia is also largely followed.

One of the dependencies of Great Britain, viz., India, has a pharm. of its own. In 1842 Dr. W. B. O'Shaughnessy, by order of the government, under the authority of the East India Company, issued "The Bengal Dispensatory" (Calcutta) as a precursor to "The Bengal Pharmacopoeia and General Conspectus of Medical Plants," which he published in Calcutta in 1844. In 1868 a "Pharmacopoeia of India" was published at the same place by Dr. Ed. J. Warrington, under authority of the Secretary of State for India. This is now but rarely used, except as a work of reference, the British Pharm. having taken its place as far as this is possible in India. The main object of issuing a separate pharm. for India was to encourage and officially authorize the use of East Indian drugs, among which are many possessing valuable properties. A useful companion to this work is the "Supplement to the Ph. of India," by Moodeen Sheriff, published by order of the government of Madras in 1869. This work contains synonyms of the pharmacopoeial articles in fourteen languages. Though not specially pharmaceutical, the following work ought to be mentioned here, as it comprises, among an immense mass of other matter, everything of importance that has ever been published on drugs

of Indian origin or cultivated in India: "A Dictionary of the Economic Products of India." By George Watt, etc. (6 vols. Calcutta, 1884-1893.)

In order to afford a uniform guide for the preparation of the most commonly used official remedies, the British Pharmaceutical Conference undertook the publication of an unofficial formulary, which appeared in 1887 under the title "Unofficial Formulary of the British Pharmaceutical Conference." This is usually quoted under the abbreviation "U. F. B. P. C." It contains thirty-seven articles. In 1889 a supplement containing nine additional articles was issued.

BULGARIA.—The Russian pharm. is generally followed.

CENTRAL AMERICAN STATES.—These States have no pharm. of their own. Various authorities are followed, mostly the French and Spanish pharm., Dorvault's "L'Officine," and in some places also the United States, Mexican and British pharmacopoeias.

CHILI.—The first Chilean Pharm. appeared in 1886, under the title "Farmacopea Chilena, obra premiada por el Supremo Gobierno de la Republica como Farmacopea Nacional. Por Adolfo Murillo, médico, Carlos Middleton, farmacéutica" (8°. Leipzig, 1886). The text is in Spanish, synonyms of the titles being given in Latin. It bears much resemblance to the last French Pharm., but is free from most of the errors contained in the latter.

CHINA.—As a matter of course China has no pharmacopoeia in the modern sense of the word. But there are numerous native works treating of the selection and preparation of animal, vegetable and mineral substances for use as medicines. The best known and most extensive work on this and kindred subjects is the "Pen tsao kang mu" (called in Japanese "Honzo-ko moku") of Li-shi-chen, written about 1560 A. D. This is an encyclopedia ("pen-tsao" means "herb book") compiled from about 1,000 different authors on some 1,900 drugs from the three kingdoms of nature, giving among other things their medical properties and about 12,000 formulas. It has often been printed in China, usually in forty volumes (some containing illustrations). A synopsis of the contents is given by E. Bretschneider in his "Botanicon Sinicum" (8vo. London, 1882, pp. 54-69).

COLOMBIA, UNITED STATES OF.—The French and Spanish pharm. are chiefly in use. In Panama and some other places the British and United States pharm. are also occasionally followed.

COSTA RICA.—See Central American States.

CROATIA.—See Austria-Hungary.

DENMARK.—In 1658 the "Dispensatorium Hafniense" was published at Copenhagen, and this was several times reprinted. The first official pharm. appeared in 1772, the second in 1805, the third in 1830, the fourth in 1840, and the fifth in 1850. The latter was, however, counted as the first work really deserving this name. Hence the next edition, which was published in 1868,

was designated as "editio secunda;" supplements to this appeared in 1874, 1876 and 1886. A new revision, containing 608 articles, appeared in 1893. The text of this is, for the first time, in Danish, only the titles being in Latin. In the latter the peculiar nomenclature in vogue in the Scandinavian and a few other countries has been retained ("chloretum chinicum" for quinine hydrochloras or chininum hydrochloricum; "sulfas atropicus" for atropinae sulphas or atropinum sulphuricum, etc.). A special pharm. for Schleswig-Holstein ("Pharm. Slesvico-Holsatica"), which belonged to Denmark up to the year 1867, appeared in 1837. Much similarity exists between the Danish, Norwegian and Swedish pharmacopoeias, which is the result of deliberate design, as these countries are closely allied in customs, tradition and language. Not many years ago the proposition was made to prepare a common pharm. for the three countries. This plan appears to have been abandoned for political reasons.

DOMINICAN REPUBLIC. — The French and Spanish pharm. are in use.

ECUADOR. — The French, United States and British pharm. are mostly followed.

EGYPT. — The French pharm., and, since the British occupation, also the Brit. pharm., are officially recognized. The German, Austrian and Italian pharm. are also in use.

FINLAND. — See Russia.

FRANCE. — In 1353 King John, "the good," commanded the apothecaries to follow the "Antidotarium" of Nicolaus Praepositus. Strict regulations regarding the practice of pharmacy were issued in 1536, and many additional ones afterwards. As early as 1546 a "Ph. Lugdunensis" was published at Lyons, which was several times reprinted. A "Paraphrase sur la Pharmacopée" was published by Bricon Bauderon of Mascon in 1588. In 1590 the Paris Faculty of Medicine was directed to prepare a "dispensatory," but, as nothing was done, Parliament in 1597 ordered twelve members of the faculty, designated by name, to prepare the work. The order was, however, not obeyed until 1637, when the "Pharmacopoea Parisina" (see below) made its appearance. Several French cities early possessed pharmacopoeias of their own: Burdigal ("Ph. Burdigalensis," 1643); Lille ("Pharm. Lillensis, 1640-); Strasbourg ("Ph. Argentoratensis," 1722-); Toulouse ("Ph. Tolosana," 1648, 1695); Valenciennes ("P. Valentianensis," 1651). A few other so-called pharmacopoeias (for instance, those of Metz, then belonging to France, Marseilles, etc.), may be omitted, as they were of a more or less ephemeral character. In 1637 appeared the "Ph. Parisina," as a precursor to the first official pharm., which was issued, in 1639, under the title, "Codex Medicamentarius, seu Pharm. Parisiensis, in lucem edita a Ph. Harduino." Revisions of this appeared in 1645, 1732, 1748 and 1758. For the next sixty years no further revision appeared, although the "Pharmacopée de Lyon," published by Vitet in 1778, to some ex-

tent served as a new edition of the Paris Codex. The next national pharmacopoeia appeared in 1818 under the title "Codex Medicamentarius, seu Pharm. Gallica," the text being in Latin. In the next and following editions the text was given in French, only the synonyms of the titles being in Latin. These editions appeared in 1827 (II.); 1839 (III.), 1866 (IV.) and 1884 (V.). The last revision was a very unsatisfactory one, as the revisers do not seem to have paid any attention to the new pharmacopoeias of the United States and of Germany, which had appeared a year or two previously, or to the copious literature relating to pharmacopoeial improvements which had been published outside of France. Immediately after the work had appeared a great number of errors were discovered in it, and the government felt compelled to make a new issue, in which 132 alterations were incorporated. Shortly afterward, however, a special pamphlet, entitled "Erratum," was sent out, in which eighty-three additional changes were directed to be made; this "Erratum," however, not only does not give all the errors, but is not free from errors itself. Preparations are being made for the issue of a new revision. It is to be hoped that the lesson learnt in 1884 will enable the revisers to bring forth a more perfect work. In connection with the French Pharm. should be mentioned the well-known work of Dorvault, "L'Officine ou Repertoire Général de Pharmacie Pratique," an exhaustive commentary and supplement to the pharmacopoeias preceding that of 1884. A revised edition (12th) of this work, by Asselin and Houzeau, appeared in 1889. This is still much used in France, and still more so, either in the original French or in Spanish translation, in some parts of the West Indies and of Central and South America.

GERMANY. — The first official formulary which appeared in Germany was that of Valerius Cordus (1515-1544), published by the city of Nuremberg in 1546 under the title "Pharmacorum omnium quae quidem in usu sunt conficiendorum ratio; vulgo vocant Dispensatorium pharmacopolarum." This work contains only a few simples, but chiefly formulas taken from Greek, Roman and Arabic medical authors, particularly from Galen, Rhazes, Avicenna, Mesue and Nicolaus Praepositus. All the preparations are of a galenical character and comprise articles taken from the three kingdoms of nature. The titles of the preparations are usually chosen from the name of one of the ingredients. Many of the titles had been in use before; others were newly coined. Some of these have continued to the present day, though in some cases the composition has ceased to correspond with the title. Cordus' Dispensatory was often reprinted, both at Nuremberg and elsewhere. There is a Paris edition of 1548, three of Lyons (1552, 1559, 1599), two of Venice (1556, 1563), etc. The first edition contained neither tinctures nor extracts or chemicals. Distillation was directed in the

preparation of essential oils. In the Nuremberg edition of 1592 the text was revised and a number of additions made, among them some American drugs (sassafras, sarsaparilla and tobacco). Chemicals also first appeared in this edition, namely, native minerals or salts, such as alum, borax, salt-petre, etc., and some artificial salts prepared from the ashes of plants or other substances. The use of the metallic salts, such as turpeth mineral, calomel, etc., which had been advocated by Paracelsus, was especially prohibited. Extracts and distilled waters were added. In the next revision, of 1598, large additions and changes were made. Among the additions were Brasil wood, Gualiac wood, Mechoacan root and many preparations from the animal kingdom. Various inorganic substances, such as white arsenic, realgar, orpiment, corrosive sublimate, calomel, etc., were also admitted. The next edition, of 1612, was not much changed and remained in force until 1666, when the fifth and last revision was published. In this the materia medica was much altered, in many cases for the worse, many kinds of animal excrements and other disgusting substances being introduced. On the other hand, there were added cinchona, jalap, balsams of Peru and tolu, tinctures and many new chemical salts under the then prevailing alchemistic nomenclature; also the well-known "pilulae perpetuae" and the drinking cups of antimony. With the exception of organic proximate principles and chemicals at that time unknown, this last edition of Cordus' work contained nearly all classes of preparations found in our modern pharmacopoeias. An unofficial formulary had been published, previous to the appearance of Cordus' dispensatory, at Augsburg in 1538, where the physicians issued a work under the title "Conclusiones et Propositiones Universam Medicinam Complectentes," containing formulas which were afterward generally followed in that section of the country. Augsburg was, at that time, the principal centre of the German trade with Italy and the Levant, hence many of the imported medicines came by way of Augsburg. In 1564 the first edition of the Augsburg pharmacopoeia ("Adolphi Occo Pharmacopoea, seu Medicamentarium pro Republica Augustana," usually quoted as "Ph. Augustana") was published, which was often revised, the last edition appearing in 1784. Cologne followed the example in 1565 by the publication of the "Dispensatorium Usuale pro Pharmacopoeis inclityae Reipublicae Coloniensis," which was replaced by the "Pharm. Coloniensis" in 1627.

The disunited condition of the countries inhabited by the German nation up to within recent times has been the means of bringing into the world many pharmacopoeias issued for separate cities and principalities, namely the following: Baden ("Ph. Badensis, 1841); Bavaria ("Ph. Bavarica," 1822; last ed., 1859); Brandenburg ("Dispensatorium Brandenburgicum," 1698 -); this formed the starting point of the later

Prussian Pharmacopoeia); Bremen ("Ph. in Usum Officinarum Reipublicae Bremensis," 1792); Brunswick ("Dispensatorium Pharm. Brunsvicensis," 1777); Erfurt ("Neue Pharmacopöe," published by Trommsdorff in 1808. This was made official by the French during the occupation, in place of the "Pharm. Borussica"); Fulda ("Dispensatorium Fuldense," 1787); Hamburg ("Dispensatorium Hamburgense," 1716; "Codex Hamburgensis," 1835, 1845, 1852); Hanover ("Ph. Hanoverana," 1706; last ed., 1861. Of this a separate edition was published for Silesia, at Warsaw, in 1744); Hessen ("Dispensatorium Electorale Hassiacum," 1806, identical with that of Westphalia (see below); "Pharm. Hassiae," 1827, 1860); Lippe ("Dispensatorium Lippicum," 1792); Lubeck ("Lubecensium Officinatum Catalogus Medicamentorum," 1725); Munster ("Dispensatorium Monasteriense," 1739); Oldenburg ("Pharm. Oldenburgica," 1801); the Palatinate ("Dispensatorium Medico-Pharmaceuticum," Mannheim, 1764); Quedlinburg ("Quedlinburgensis Officina Pharmaceutica," 1665); Ratisbon ("Dispensatorium Pharmaceuticum Ratisbonense," 1727, 1737); Saxony (Piderit's "Pharmacia Rationalis," Cassel, 1779-81, was made official by the French in 1805. In 1820 appeared the "Pharm. Saxonica," last ed. in 1859); Silesia (see above under Hanover); Stralsund ("Actuarium Pharmacopoeae Stralsundensis," 1645); Strasburg (see under France, to which it belonged from 1681 to 1870); Westphalia ("Dispensatorium Westphalicum," 1808. This is a revised edition of Piderit's "Pharmacia Rationalis," see under Saxony); Wurttemberg ("Pharm. Wirtembergica," 1741; last ed., 1847); Würzburg ("Pharm. Herbipolitana, 1782; "Pharm. Vireburgensis, 1796). Several of the before-mentioned works were repeatedly revised, and some of them many times reprinted. A few of them are more properly to be reckoned among local ordinances concerning the charges for medicines and giving a list of those which must be kept on hand, than among real pharmacopoeias. It is difficult to draw the line sharply.

The most important of all former German pharmacopoeias was, undoubtedly, the Prussian. This had its beginning in the Brandenburg Dispensatory of 1698, the last revision, or sixth edition, of which appeared in 1781. In 1799 the first "Pharm. Borussica" was published. The succeeding editions appeared in 1801 (II.), 1813 (III.), 1827 (IV.), 1829 (V.), 1846 (VI.); this is regarded as the best pharmacopoeia of its time; the last edition appeared in 1862 (VII.). Four editions of a special military pharmacopoeia were also published, the last one in 1868.

The problem of a common pharm. for all German States had often been agitated. In 1861 Dr. Walz proposed the publication, by private enterprise, of a German pharmacopoeia, which was to be recommended for adoption, or at least as a model, to the several German States. The work appeared in 1865 under the title "Pharmacopoea

Germaniae." Among the compilers were two Austrians, as it was at that time believed that the work might be accepted by all the German-speaking people. But the war of 1866 between Prussia and Austria rendered the project as originally conceived impracticable. A second edition of the work was then issued in 1867, in which the Austrian members were omitted. Yet even this failed of recognition. It was only after the establishment of the German Empire that the desired object was attained. In 1872 was issued the first "Pharmacopoea Germanica," which superseded all the individual pharmacopoeias at that time in force in the different States of the Empire. Some amendments to this were published in 1873. When the time for a new revision arrived, the government invited all medical and pharmaceutical bodies and the prominent men in both professions to submit proposals regarding the new revision. Contributions were received from many sources, and these were printed by government in a large folio volume of 691 pages. The Committee of Revision consisted of thirty-three members, under the presidency of Dr. Struck, the director of the Imperial Health Department. The original draft of the new pharm. was first printed in German (folio), for use of the members chiefly; was then translated into Latin and finally issued in 1882, to go into effect on Jan. 1, 1883. An official German translation was likewise published. An English translation, by C. L. Lochman, appeared in New York in 1884. In 1887 the government organized a Permanent Pharmacopoeia Commission. This body held its first session in April, 1887, and issued, in 1890, the third edition of the German pharm. under the title "Arzneibuch für das Deutsche Reich. Dritte Ausgabe. Pharmacopoea Germanica. Editio III." It contains 603 articles. With the exception of the titles of the pharmacopoeial articles, the text is entirely in German, the Latin language having been abandoned in accordance with the changes in educational matters then proposed, and subsequently carried out, one of the principal features of which was to curtail the scope of instruction in the classical languages in the schools and gymnasiums. The new pharm. had the advantage of a much larger number of expert advisers and co-operators than its predecessors, most efficient help being furnished more particularly by the Pharmacopoeia Committee of the German Pharmaceutical Association (Deutscher Apotheker Verein). At the end of the year 1893 a small supplement "Nachtrag zum Deutschen Arzneibuche" was issued. This contained alterations to twenty-nine articles of the pharm. and fifteen new articles, together with some modifications in the tables of doses, etc. Some very important commentaries on the third edition of the German pharm. deserve mention here: "Kommentar zum Arzneibuch f. d. Deutsche Reich," etc., by H. Hager, B. Fischer and C. Hartwich (2 vols. 8vo. Berlin, 1891-92). "Commentar z. Arzneibuch f. d. D. R.," by Bruno Hirsch and Alfred

Schneider (8vo. Göttingen, 1891-92). "Kommentar," etc. (as before), by G. Vulpius and E. Holdermann (8vo. Leipzig, 1891).

The example set by the profession in the United States (1886 to 1888) and Great Britain (1887) in preparing national formularies of unofficial preparations was followed, in 1891, by Germany, where the "Deutscher Apotheker Verein" published a similar work under the almost unquotable title "Arzneimittel welche in dem Arzneibuch für das Deutsche Reich, Dritte Ausgabe (Pharmacopoea Germanica, editio III.) nicht enthalten sind" (Remedies which are not contained in the Arzneibuch, etc.). This contains 811 articles.

GREECE.—The first Greek Pharm. was published in Athens under King Otto in 1837 under the title 'Ελληνική Φαρμακοποιία παρὰ Ἰωάννου Βούρου, Χανερίου Λανδέρου, Ἰωσήφ Σαρτορίου etc. ("Greek Pharmacopoeia, by Joannes Bours, Xaverios Landerer, Joseph Sartorius," etc.) It was based on the French, Bavarian and other pharmacopoeias. The text is in Latin and modern Greek, side by side. Synonyms are given in Italian, French, English, Spanish and Turkish wherever possible or deemed necessary, but they are full of mistakes. In 1868 Prof. Landerer had the work reprinted with a supplement (παράρτημα) of the newer preparations, an etymological glossary (containing many errors) and a table of antidotes. This reprint was officially recognized by the government, but at the present time it is only rarely used or referred to. The French Codex and the German Pharm. are the leading authorities.

GUATEMALA.—See Central American States.

HAWAIIAN ISLANDS.—The United States Pharm. is generally followed.

HAYTI has no pharm. of its own. The French Codex is mostly followed; also, to some extent, the British and United States pharm.

HONDURAS.—See Central American States.

HUNGARY.—See Austria-Hungary.

ITALY.—Italy was the first country in Europe in which an official pharmacopoeia was published. This was the "Antidotarium Florentinum" (Florence, 1498), already mentioned above under Mediaeval Europe. Other similar works were published for the following cities or states: Bergamo (Ph. Bergomensis," 1580-[-]); Bologna ("Antidotarium Bononiense," 1574-[-]; subsequently "Antidotarium Collegii Medicorum Bononiensis," 1750-[-]); Ferrara ("Pharmacopoeia Ferrariensis," 1725-[-]); Genoa ("Formulario Farmaceutico," 1791); Mantua ("Antidotarium Mantuanum," Venice, 1559); Messina ("Pharm. seu Antidotarium Mesanense," 1629); Naples ("Antidotarium Neapolitanum," 1649); Parma ("Pharm. Parmensis," 1823; in 1839 appeared another edition of this work for Piacenza, Parma and Modena in common); Rome ("Antidotarium Romanum," 1583-[-]; "Codice Farmaceutico," 1868-69); Sardinia ("Pharm. Sardo," Cagliari, 1773; the last edition,

"Farmacopea per gli Stati Sardi," 1853); Turin ("Pharm. Taurinensis," 1736); Venice ("Pharm. Veneta," 1617; "Codice Farmaceutico," Padua, 1790). Up to 1859 the Austrian pharm. was the official guide in the Lombardy and in Venice, and up to 1866 in Venice alone. After both of these territories had been annexed to Italy, some of the Italian pharmacopoeias came more prominently into use in these sections of the country. In many of the Italian States the dispensatory published by Orosi under the title "Farmacologia teorica e practica, ovvero Farmacopea Italiana" was used as a standard authority; later also the "Farmacopea Nazionale e Generale, Materia Medica e Terapia," by Ruata (8vo. Verona and Padua, 1883).

A commission for the publication of a national pharmacopeia was appointed soon after the unification of the kingdom of Italy, and several attempts were made to prepare the work ready for issue, but no result was obtained until repeated changes had been made in the personnel of the commission. The work finally appeared in 1892 under the title "Farmacopea ufficiale del Regno d'Italia" (8vo. Rome). The main titles of the pharmacopoeial articles, of which there are 597, are in Italian, with Latin synonyms. This pharm. contains some novel features, some of them of questionable utility. Thus, for instance, in the case of powerful drugs, the percentage of active principles which they contain or are expected to contain is given, without any directions how this percentage is to be determined. For instance, under *Belladonna* it is stated that "the root and leaves contain about 0.5 per cent. of hyoscyamine and atropine." Under *Jaborandi*: "Contains pilocarpine (about 1 per cent.)." Under *Colchicum*: "The bulbs contain 0.08 to 0.2 per cent. of colchicine; the seeds 0.2 to 0.4 per cent.," etc. Yet in none of these and a number of other cases is there a process of assay given. In a pharmacopeia it is clearly illogical to demand of any drug or preparations definite conditions, expressed by figures, when there is no reliable process known or given by which uniform results can be obtained.

JAPAN.—In 1880 a mixed commission of twenty-one Japanese and European experts was appointed by the government for the purpose of preparing a pharmacopeia. Among the Europeans were Prof. Eijkman, Dr. Langgaard, Dr. von der Heyden, Dr. Geerts, etc. This commission concluded its labors in 1886, and published the first Japanese pharm. under the title "On yaku zuki Nippon yaku kiyoko ho." It forms a volume of nearly 400 pages, 8vo., the text being in Japanese. It contains 475 titles, with an appendix of various tables and a Japanese and Latin index. The original draft was made in German, which was then translated into Japanese and subsequently into Latin. The Japanese text was declared to be the official one. The scientific chemical, botanical and zoological terms are given in Latin, in Roman characters, with Japanese

transliteration. In the treatment of the subject, the United States, British and German pharmacopoeias were chiefly followed, but with notable independence on the part of the authors. The sign ∇ , placed under an unusual quantity of a powerful remedy by the prescriber, is to denote the fact that the unusual amount was ordered designedly. In European practice it is customary to express this by an exclamation sign (!) placed after the figures or words expressing the quantity. In some countries prescribers are compelled to write out such unusual quantities in words. As an aid to the better understanding and study of this work Zonroku Goigé and Suimatsu Takahashi published a "phonic" edition, in which the Latin names of chemicals and drugs were transliterated phonetically into Japanese (8vo., Tokio, 1886). A new edition of this work was issued in 1891 under the title "Pharmacopoea Japonica. Editio altera. Tokyo, Anno XXIV. Meiji (1891)." It is wholly in Latin and contains 440 articles. In chemical nomenclature the method used in the German and Austrian pharmacopoeias was followed ("Kalium aceticum" for "Kalii (or Potassii) Acetas," etc.).

LIBERIA.—The United States and British pharm. are usually followed.

MEXICO.—In 1874 the Pharmaceutical Society of Mexico published a pharmacopeia under the title "Farmacopea Mexicana de la Sociedad Farmacéutica de Mexico," which was officially recognized by government. It was one of the best pharm. of its time. In 1884 a second edition ("Nueva Farmacopea Mexicana," etc.) was published by the same society, the main work being performed by Prof. Alfonso Herrera. It presents, among other special features, a very copious materia medica, much attention being paid to native drugs or products. The text is in Spanish, in two columns. In general, the work rather corresponds to what we would call a dispensatory, since it treats also of the medical properties and uses of the several drugs and preparations. It is a very carefully prepared and useful work. In 1890 the same society published a supplement under the title "Apendice á la segunda edicion de la Nueva Farmacopea Mexicana de la Sociedad Farmacéutica de México. Escrita por la Comisión Permanente de la Farmacopea." This work is a literary curiosity, teeming with blunders of fact, orthography and nomenclature (see the review of the work in the *American Druggist*, 1891, page 291).

NETHERLANDS.—The frequent political changes in the Low Countries were not without influence upon the existence or validity of the pharmacopoeias which appeared from time to time within their borders. The earlier pharmacopoeias were of a local character and as such were not readily affected by political changes. These are the following: Alomar ("Pharm. Almarimensis," 1723); Amsterdam ("Pharm. Amstelodamensis," 1636; last edition, 1792); Dort ("Pharm. Dordracena," 1708; last edition, 1766); Groningen

("Pharm. Groningana," 1729[-]); Haarlem ("Pharm. Harlemensis," 1693; last edition, 1741); The Hague ("Pharm. Hagana"—afterwards "Ph. Haglensis"—1652; last edition, 1758); Leiden ("Pharm. Leidensis," 1638[-]); Leeuwarden ("Pharm. Leovardiensis," 1687; last edition 1745); Rotterdam ("Pharm. Roterodamensis," 1709; last edition, 1835); Utrecht ("Pharm. Ultrajectina," 1656; last edition, 1749). At one time the Netherlands were under the dominion of Austria. Hence the Austrian pharmacopeia which was issued in 1774 received the title "Pharm. Austriaco-Provincialis," being intended for all the countries under the Austrian sceptre or influence. A Dutch translation of this was published in 1781. After the establishment of the Batavian Republic (1795-1806) a commission was appointed to draft a pharm. This was completed and published in 1805, under the title "Pharm. Batava." It was a work of great merit, being by far the best pharm. of its time. It was extended and commented upon by Nieman, in 1811 (second edition, 1824) in an exhaustive manner.

The first "Pharm. Neerlandica" appeared in 1851, in two editions—one in Latin, the other in Dutch. It had a great resemblance to the French Codex. A revised edition—also in Latin and Dutch—was issued in 1871. It contained 655 titles. In 1884 a Government Commission was appointed to prepare a new edition. This appeared in 1889, under the title "Nederlandsche Pharmacopee. Derde Uitgave (3d edition). 's Gravenhage, 1889." It contains 596 articles. With the exception of the titles of the official articles, the text is entirely in Dutch. It was shortly afterward followed by a Latin translation, under the title "Pharmacopoea Neerlandica. Editio tertia, Hagae Comitum, 1889." While in the case of the two previous editions the Latin text was recognized as official, in the third edition the Dutch text was ordered to be taken as the standard.

In 1891 the Rotterdam branch of the Netherlands Pharmaceutical Society (Nederlandsche Maatschappij ter Bevordering der Pharmacie) followed the example of other countries, by issuing an unofficial formulary, on the plan of the National Formulary of the United States, under the title "Supplement op de derde Uitgave der Nederlandsche Pharmacopee." It contains 573 articles.

NICARAGUA.—See Central American States.

NORWAY.—Norway did not possess a pharm. of its own until 1854, the Swedish pharm. having been used in the country up to that time. A second edition of the "Pharm. Norwegica" was published in 1870, and this was reprinted, with additions, in 1879. It contains 398 articles. In nomenclature and other respects it bears a close relationship to the Swedish and Danish pharmacopoeias. A new and revised edition of the Norwegian pharm. is expected to appear in the beginning of the year 1895.

PARAGUAY.—The French, Spanish

and Portuguese pharmacopoeias are usually followed.

PERSIA.—In 1681 Father Ange de la Brosse de St. Joseph published at Paris the "Pharmacopoea Persica, ex idiomate Persico in Latinum conversa." That this is no translation of an original Persian work was recognized by Thomas Hyde, the learned librarian of the Bodleian Library at Oxford (died 1707), who thought it was the work of Father Mathieu, a missionary belonging to the same order as Father Ange. Leclerc (in his "Histoire de Médecine Arabe," Paris, 1876, vol. II., 481) reports that it is a translation of an Arabic work existing in the National Library at Paris. It bears internal evidence of the intimate acquaintance of the author with European medicines, some of which were at that time probably still unknown to the Persians, while others, which were certainly known to them (for instance, opium) were omitted. In 1771 Mir Mohammed Hussain, of Khorasan, wrote a Persian pharmacopoeia, and subsequently an encyclopaedia of materia medica (Makhzân el-adwiya—treasury of medicine; see on this, "The Vegetable Materia Medica of Western India," by W. Dymock, 2d ed., preface.)

PERU.—The French and Spanish pharmacopoeias are usually consulted. In some places also those of Great Britain and the United States.

POLAND.—See Russia.

PORTUGAL.—In 1704 Caetano de Santo Antonio published a "Pharmacopoea Lusitana Galénica" at Coimbra. This was republished at Lisbon as "Pharm. Lusitana" in 1711, and twice reprinted. It is also quoted as "Pharm. Ulissiponensis," but the writer has never seen a copy having this title. In 1785 appeared Paiva's "Pharmacopoea Lisbonense," which was semi-official, and in Coimbra, in 1794, the "Farmacopoea do Pinto," which was, however, soon forgotten over the appearance in the same year of the first official pharm., prepared by Dr. Tavares, and published at Lisbon under the title "Farmacopoeia geral para o Reino o Dominios de Portugal." In 1825 this was replaced by the "Pharm. Lusitana," and this was followed in 1838 by the "Código Pharmaceutico Lusitano," which was revised in 1858. Finally a new "Pharmacopoeia Portuguesa" was issued in 1876. This was prepared with much care and judgment. The text is in Portuguese, except the synonyms of the titles, which are in Latin. It forms a notable contrast to the Spanish pharmacopoeia, since it was, unlike the latter, shorn of much of the obsolete rubbish of the therapeutics of olden times.

RUMANIA issued a pharm. in 1861 under the title "Pharm. Romana" (Bukharest). A second revised edition appeared in 1874. The text throughout is in Rumanian, without Latin synonyms. It bears some resemblance to the Austrian pharmacopoeia.

RUSSIA.—Until the year 1866 Russia had no official general pharmacopoeia. There was one for the army, which was first issued in 1765. A revised edition of this appeared in 1779 under the

title "Pharm. Castrensis Rossica." In 1783 there appeared a special pharm. for the navy (Pharm. Navalis). Both of these were superseded in 1808 by the "Pharm. Castrensis Ruthenica," edited by Dr. James Wylie of Moscow. This was several times revised, the last edition being issued in 1866. A civil pharmacopoeia appeared as early as 1778 at St. Petersburg (reprinted in 1782) under the title of "Pharm. Rossica," and a second edition in 1798 (reprinted in 1803). But these were not officially recognized, the pharmacists being compelled to consult almost every prominent European pharm. to fill the prescriptions brought to them from time to time. The most generally followed foreign work was the "Pharm. Borussica." In 1866 the first official civil pharm., prepared by Dr. Trapp, was issued. This was followed by revised editions in 1871, 1880 and 1891. The title of the pharm. is "Rossiiskaya Pharmakopeya," etc. The text of the work is in Russian. The main titles and synonyms, however, and the names of the ingredients entering into any preparation are in Latin. The number of articles in the last edition is 808. A special pharm. for the use of the imperial court was published in 1874. Hence, there are four pharmacopoeias in existence—the military, naval, civil and court pharmacopoeia. The military pharm. is, in some respects, more in the nature of a dispensatory, as it gives details not usually included in a pharm.

A separate pharm. was published for Poland at Warsaw in 1817 under the title "Pharmacopoea Regni Poloniae," but this did not remain long in force.

Finland issued a pharm. of its own (Pharm. Fennica) in 1819 at Abo. Revised editions of this appeared at Helsingfors in 1850 (II.), 1863 (III.) and 1885 (IV.). The text of this pharmacopoeia is in Latin. It bears a great resemblance to the several Scandinavian pharmacopoeias, and in certain features still more to the German pharm. (2d edit.) In extent it is one of the smallest, comprising only about 400 articles.

SALVADOR.—See Central American States.

SCHLESWIG-HOLSTEIN.—See Denmark.

SERVIA.—A Servian pharm. was published in Belgrad in 1881 under the title "Pharm. Serbica. Editio Prima." The text is wholly in Latin. Among the tables is one, in Servian, giving a list of poisons and antidotes. It is without exception the most slovenly edited pharmacopoeia ever published, and the most remarkable specimen of governmental book printing. At the end is a list of not less than 257 misprints and errata, covering five pages. But this list is far from being complete.

SOUTH AFRICAN COLONIES AND STATES.—In nearly all of them the British Pharm., and preparations made in accordance with it, are in vogue.

SPAIN.—Previous to the appearance of a national work certain provinces and cities issued pharmacopoeias of their own, viz.: Almeria ("Pharm. Almeloviana," 1724; "Ph. Almeriana,"

1726); Catalonia ("Pharm. Catalona," Barcelona, 1686); Madrid ("Pharm. Matritensis," 1739-[-]); Salamanca ("Pharm. Salamanca," by J. Bravo, 1588); Saragossa and Valencia ("Oficina Medicamentorum," 1601-[-]). In 1521 was published in Madrid the "Examen Apothecariorum," which had been written by Pedro Benedicto Mateo in 1497, and which, according to Mallaina, had all the characters of a pharmacopoeia. The first national pharm. appeared in Madrid in 1794 under the title "Pharm. Hispana." This and the three next editions of 1798, 1803 and 1817 were in Latin. The fifth (1865) and sixth (1884) editions are in Spanish, with Latin synonyms of the titles. The title of the last edition is "Farmacopoea Oficial Española." Of all modern pharmacopoeias this shows the least progress, having retained many of the unscientific and obsolete drugs and preparations of the past. In other respects it appears to have followed the French Codex as a guide and pattern. In the number of articles, of which it contains nearly 1,700, it is only exceeded by the last mentioned work.

SWEDEN.—A "Pharm. Holmiensis" was published in Stockholm in 1686. The first work bearing the title of "Pharm. Suecica" appeared in 1705, but it was not recognized as official. The first official pharm. appeared in 1775, and the succeeding editions in 1779 (II.), 1784 (III.), 1790 (IV.), 1817 (V.; in this edition the chemical part was edited by Berzelius, and the botanical and zoological by Swartz; it was the most advanced and most perfect pharm. of its time); 1845 (VI.); 1869 (VII., with supplement of 1879). The last edition, as well as some of the preceding ones, has been several times reprinted with amendments. It bears much resemblance to the Danish and Norwegian pharmacopoeias. The text is in Latin, and the number of titles 677. A revised edition is in course of preparation.

SWITZERLAND.—A "Pharm. Helveticorum" was published in Geneva in 1677. It had no official character. In 1684 there appeared in the same city an edition of Charas' "Pharmacopoea Regia Galenica et Chymica," which was followed as authority for a long time. The Basle Medical Society in 1771 published a "Pharm. Helvetica" in 2 vol. fol., containing an introduction by Albert von Haller. A "Pharm. Genevensis" appeared in 1780, and was several times reprinted. A special pharm. for the Canton of Tessin was published in 1848 (not seen by the writer). In 1852 an elaborate draft of a pharm. for the Canton of Berne was published at Berne under the title "Pharmacopoeae Bernensis Tentamen." This may be regarded as the precursor of the "Pharm. Helvetica," published at Schaffhausen in 1865 by the Swiss Pharmaceutical Society. This work was accepted by and officially recognized by a number of the Cantons, but not by all. A second edition appeared in 1872, and a large supplement in 1876. The text is in Latin. A commission, under the presidency of Prof. Schaer, was engaged for several years in the

preparation of a new work, which was completed and issued in 1893 in three languages—German, French and Italian. The title is "Pharmacopoea Helvetica. Editio tertia." It contains 794 articles. The text of each edition is in the respective modern language, only the titles of the articles being in Latin. It is the first pharm. which attempts to introduce methods of assay for a number of drugs and preparations, with distinct directions regarding the methods of assay. Yet there are features of uncertainty surrounding most of these methods, since in most cases they disregard the necessity of identifying the products obtained to the exclusion of added substances. In other respects it is one of the best pharmacopoeias ever issued. Curiously enough, when the question of its official acceptance was submitted to the several Cantons, that of Glarus (the only one out of 22) refused to accept it.

TURKEY.—It is not surprising that Turkey has no pharmacopoeia, for those who know the methods of administration prevailing in Turkey and its dependencies are aware that a law regarding the exercise of the professions of medicine and pharmacy or sanitary laws cannot be expected to be obeyed and strictly followed in any but the larger cities, and under a military or semi-military commander. Officially the French Codex is recognized throughout Turkey by authority of the Imperial Medical Council at Constantinople, but the cosmopolitan nature of the inhabitants of this and many other cities of the empire renders reference to various other pharmacopoeias necessary.

URUGUAY.—The French, Spanish, Portuguese and occasionally other pharmacopoeias are followed.

VENEZUELA.—Most in use are the French and Spanish pharmacopoeias. The Medical Council at Caracas some years ago took initiatory steps to prepare a national pharmacopoeia, but nothing has come of it so far.

IV. UNITED STATES OF AMERICA.

The first pharm. which was published in the United States was a military one, a small volume published in 1778 at Philadelphia for the Military Hospital of the U. S. Army, located at Lititz, Lancaster County, Pa., under the title "Pharmacopoeia simpliciorum et effiaciorum in usum noscomii militaris ad exercitum foederatarum Americae civitatum pertinentis; hodiernae nostrae inopiae rerumque angustii, feroci hostium servitiae, belloque crudeli ex inopinato patriae nostrae illato debitis, maxime accommodata" ("Pharmacopoeia of the more simple and efficacious (remedies) for the use of the Military Hospital of the Army of the United States of America; particularly adapted to our present poverty and distress, which is due to the ferocious cruelty of the enemy and to the bloody war unexpectedly waged against our fatherland"). Only one copy of this edition is known to exist, which is in the library of the office of the Surgeon-General of the U. S. army at Washington. Of a second edition, issued in 1781, there appears to be likewise only

a single copy in existence. (See Amer. Journ. Pharm., 1884, pg. 483). Upon the title page of this edition appears the name of Dr. William Brown, as author. It is entirely in Latin (in both editions), in 32 pages. It contains 84 internal and 16 external remedies.

Previous to the year 1820 various European pharmacopoeias, particularly those of London, Edinburgh and Dublin, were used in the United States. The want of a National pharm. was to some extent filled by the following works: "The American Dispensary," by John Redman Coxe (Philadelphia, 1806-), and "The American New Dispensary," by James Thacher (Boston, 1810-), which were the precursors of the dispensaries now in vogue in this country. In 1792 the physicians of Charleston, South Carolina, adopted a scale of prices for medical treatment and medicines somewhat on the plan of similar ordinances in vogue in Europe. In 1808 the "Pharmacopoeia of the Massachusetts Medical Society," which was chiefly based upon the last preceding edition of the Edinburgh pharm., was published at Boston, and in 1816 the "Pharm. of the New York Hospital" at New York. The first movement toward the creation of a national pharm. was started by Dr. Lyman Spalding in a plan laid before the Medical Society of the County of New York in January, 1817. (For details of the history of the Pharmacopoeia of the United States of America consult the introduction to the seventh revision of this work, published in 1893.) The first convention for the formation of a national pharm. assembled at Washington on January 1, 1820, at which time the drafts which had been prepared by the several district conventions were consolidated and revised. The finished work was published in Boston on December 15, 1820, in Latin and English. The contents were divided into "Materia Medica," of which there was a primary and a secondary list, and into "Preparations," though the title of the latter section was omitted. A second edition, or rather reprint, was issued in 1828. Before the convention of 1820 adjourned it made provisions for a revision of the work by arranging for the call of a convention in 1830. Owing, however, to a misunderstanding two separate conventions were held in this year, one meeting at New York and the other at Washington, and two separate pharmacopoeias resulted from this, one being published at New York in 1830, which was, however, repudiated by the leading pharmacists of this city; the other at Philadelphia in 1831. Fortunately the bodies which had met at New York subsequently abandoned the plan of continuing a separate revision in the future, and in 1840 the third general convention assembled in Washington. The Committee of Revision appointed by this convention was authorized to request the co-operation of the colleges of pharmacy, and this resulted in the contribution of much valuable material. The new revision was published in 1842, the text being for the first time in English, only the titles and synonyms being in Latin. At the next convention,

in 1850, the incorporated colleges of pharmacy were, for the first time, invited to participate in the deliberations. Previous to this time only incorporated medical colleges or societies had been invited to send delegates. The first edition of the work appeared in 1851, and a second edition was issued in 1855. The next two conventions met at the appointed time, in 1860 and 1870, and the fifth and sixth editions (fourth and fifth revisions) of the U. S. P. were issued, respectively, in 1863 and 1873. Several years before the next succeeding convention of 1880 a very lively interest was awakened in the proposed new revision of the work, and various plans were brought forward toward effecting a radical change in the manner of revising and publishing the pharmacopoeia in the future. Much preliminary work was also bestowed, principally on the part of the American Pharmaceutical Association, upon the plan and contents of the next edition. The convention which assembled at Washington in 1880 was the most representative of any that had so far been held, and after a general plan of revision had been adopted, a Committee of Revision and Publication was appointed, consisting of twenty-five members residing in various parts of the United States. As a result of their labors the sixth decennial revision (or seventh edition) of the U. S. P. was issued toward the end of the year 1882. In this revision radical changes were made, the intention being to render the work as independent of commentaries as possible. The arrangement of the titles was alphabetical throughout, the classification of articles into *materia medica* (primary and secondary lists) and preparations being abolished. Crude drugs and chemicals, wherever possible or necessary, were defined, described and tests of identity and purity added. Actual weights and measures were replaced by the indeterminate system of "parts by weight," except in the case of fluid extracts. Many obsolete articles were dropped and many new ones admitted, the total number of titles being 997. The new work was very favorably received by the medical and pharmaceutical professions of this country, as well as by competent critics abroad. Certain new features, however, which had been introduced by order of the convention of 1880, and which at that time were deemed necessary, and had been, as it was believed, wrongly kept out of the work by previous committees, were gradually found to be less suitable for this country than had been anticipated. This was chiefly the case with the system of "parts by weight," which can successfully prevail only in those countries where prescribers direct all ingredients in their prescriptions by weight. The committee kept careful track of the expressions of opinion regarding this subject which appeared in the course of time, and were prepared at the succeeding convention to propose a remedy: During the latter part of the decade the committee undertook the task of compiling, from the literature which had appeared in the United States and other countries, all criticisms and sug-

gestions bearing upon the work, and issued a "Digest of Criticisms on the U. S. Pharm., Sixth Decennial Revision (1880)" in three parts for the use of their successors. In 1890 a new convention assembled at Washington. At this 29 medical schools or colleges, 23 medical societies, 31 pharmaceutical associations or societies, 25 schools or colleges of pharmacy, and the U. S. Army, Navy and Marine Hospital Service were represented by 148 regular delegates and 20 alternates, and a Committee of Revision, consisting of 26 members, was appointed. After a thorough discussion the system of "parts by weight" was ordered to be abandoned, and the metric system of weights and measures to be adopted in its place. A detailed account of the instructions given to the Committee of Revision will be found in the preface of the new work (The Seventh Decennial Revision, or Eighth Edition), which was issued on August 15, 1893. This work became official on January 1, 1894. It contains 994 articles. Since its publication it has been subjected to the criticism of competent judges, as well as to practical tests, and, though not free from errors—what human work ever is?—has received general commendation and recognition by both professions. The next convention for revising the U. S. Pharm. will assemble in Washington on the first Monday of May, 1900.

In connection with the U. S. Pharm. should be mentioned the commentaries which have appeared from time to time to explain and supplement it. In 1833 appeared the first edition of "The Dispensatory of the United States of America," by George B. Wood, M. D., and Franklin Bache, M. D., which was, from that time until the present, usually quoted as "U. S. Dispensatory." Since its appearance it has been sixteen times revised and enlarged, the last edition (of 1,930 pages) having been issued in 1894. In 1889 Prof. Alfred Stillé and Prof. John M. Maisch published a similar work under the title "National Dispensatory." The fifth edition of this work (of 1,903 pages) was likewise issued in 1894. Both works embrace the text of the U. S. Pharm. of 1890, by permission of the Committee of Revision. A commentary to the U. S. Pharm. of 1880 was published by Prof. O. A. Wall and Prof. Oscar Oldberg in 1884, under the title "A Companion to the U. S. Pharmacopoeia." All of these works, and more particularly the two first named in their new editions, have a large circulation throughout the United States.

In 1886 the American Pharmaceutical Association undertook the publication of a national formulary which would provide standard formulas for the most commonly employed unofficial preparations. This work took its origin from the "New York and Brooklyn Formulary," which had been prepared some years previously for the cities of New York, Brooklyn and their vicinity, and which had been accepted as a guide and standard in so many other localities that the societies by whom it had been issued offered it to the American Pharm. Association as a basis for the

foundation of a more comprehensive work. The offer was accepted, and the "National Formulary of Unofficial Preparations, First Issue," was published in 1888. It contains 435 articles. This work has rendered important service to the pharmaceutical profession, inasmuch as it has enabled the pharmacist in many cases to furnish reliable preparations made by himself in the place of those which he had heretofore been compelled to purchase ready made. Moreover, it enabled physicians to prescribe preparations of known composition instead of proprietary ones, regarding which there is always some doubt. The work is now undergoing revision.

V. GENERAL PHARMACOPŒIAS.

Many works have been published designed to comprise the text of all, or at least of the more prominent pharmacopœias, or to serve as general pharmacopœias, irrespective of the contents of the several national works. Among the earlier authors of such works are the following: Lemery ("Pharmacopée Universelle," Paris, 1697, many times reprinted); Triller ("Dispensatorium Pharm. Universale," Frankfurt o' M., 1764-); Spielmann ("Pharm. Generalis," Strasburg, 1783-); Reuss ("Dispensatorium Universale," Strasburg, 1786-); Mayr ("Disp. Universale," Vienna, 1798); Swediaur ("Pharm. Medici Practici Universalis," Leipzig, 1803); Charas ("Pharmacopée Royale, Galénique et Chymique," Paris, 1672-); Dornceilius ("Dispensatorium Novum," Lisbon, 1600-); Brugnatelli ("Farmacopea Generale," Pavia, 1807; a previous edition (1802) under another title); Quincy ("Pharm. Officialis et Extemporanea," London, 1717-). Of more recent works the following deserve special mention: A. J. Jourdan ("Pharmacopée Universelle," Paris, 1828; second edition 1840); P. L. Geiger ("Pharm. Universalis," Heidelberg, 1835-1845). The most important, however, is the work of Dr. Bruno Hirsch, "Universal-Pharmakopöe. Eine vergleichende Zusammenstellung der zur Zeit in Europa und Nordamerika gültigen Pharmakopöen" ("Universal Pharmacopoeia—a comparative digest of the pharmacopœias at present in force in Europe and the United States," 2 vols., Svo, Leipzig, 1885-89). This work contains practically the whole text of the several pharmacopœias which had appeared in 1885 (except those of Mexico, Portugal and Servia), as well as of those which appeared during the publication of the work (1885-1889), in such a way that the similarities and differences of the several texts, regarding one and the same drug and preparation, are shown at a glance. It is a work of reference which will be indispensable to every revision committee in this and other countries for many years to come.

VI. INTERNATIONAL PHARMACOPŒIAS.

Many years ago efforts were made to bring about greater harmony in the different pharmacopœias, and a proposition was brought forward to prepare an International Pharmacopoeia. Opinions differed greatly as to the feasi-

bility of the plan, as well as regarding the scope or contents of such a work. Steps were finally taken to have a draft of the work prepared, but national jealousy on several occasions rendered its acceptance by other nations impossible. It was not to be expected that each civilized nation would abandon its own pharm., which was especially adapted to the habits of its own people and to its own domestic resources, and that it would adopt in place of it a work prepared without regard to such considerations—one which would possibly introduce unfamiliar preparations or change the strength of such as were in common use. The utmost that could be expected was that the different nations, whenever revising their own pharm., would gradually approximate such preparations as were considered amenable to international regulation, to the proposed standard. Another hope which was expressed was this, that the International Pharmacopoeia might be used and followed as an independent work in different countries, alongside of the national pharmacopœias; in this way that the prescribers were to designate the preparations of the International Pharm. in a special manner. At the International Pharm. Congress, held at Brussels, in 1886, Baron A. von Waldheim of Vienna presented the draft of an International Pharmacopoeia. But in its preparation the other members of the commission, appointed at the preceding congress, had not been sufficiently consulted, and it has, therefore, never been officially accepted or come into use. At the last congress held in Chicago, in 1893, the project was brought up again and placed in charge of a committee, to report at the next congress. In September of 1893 the Pan-American Medical Congress met at Washington. It was there proposed to attempt the preparation of a Pan-American Pharmacopoeia, and a committee was appointed to carry out the proposition, if possible. This committee has developed a plan of work which may lead to good results, provided the pharmaceutical bodies, or governmental authorities, or professional individuals, to be selected in the different countries, will promptly organize and execute the tasks assigned to them. At best it will require several years to settle even the scope of the work. It is proposed that as many of the representatives as can arrange for it shall meet at the next Pan-American Congress, which will assemble in the City of Mexico, in 1895.

VII. GENERAL REMARKS.

A pharmacopoeia should represent the broad results of therapeutic observations and investigations accepted by, or at least acceptable to, the medical profession at large, in the country for which the work is written. In general, therefore, it should not introduce insufficiently tried new remedies or methods, but should accept only those which have, by matured and careful study, been found worthy of recognition. An exception to this rule may occasionally be found admissible, when

6/

a new form of preparation is introduced to take the place of one which has been found unsatisfactory. On the other hand, it ought to contain all remedies which are used in legitimate practice, and which the physician openly and designedly uses to obtain definite results. At the present time it is impossible to open any medical periodical or text-book on therapeutics without constantly encountering the names of the newer synthetic chemical remedies, such as antipyrine, sulfonal, phenacetin, aristol, etc., and yet these are kept out of the United States Pharmacopoeia. Up to the year 1890 there was probably a sufficient excuse for this because the permanency of many of these compounds was not yet fully assured, and the proprietary claims surrounding most of these substances were regarded as an ethical barrier against their recognition. It appears, however, that the views regarding the status of these remedies are gradually changing in favor of their future recognition. Most surely they should not be classed with proprietary nostrums, for in most cases their chemistry, mode of manufacture, constants of nature, reactions and tests are scientifically determined and known, and it is equally certain that they will be employed by the medical profession, whether they are recognized by the pharmacopoeia or not. Their multiplication, aside from other causes, will gradually diminish the number of many of the more old-fashioned, and, to a large extent, empirical preparations now official. Eventually the time might arrive when the majority of the energetic and efficient remedies used by the physician would have to be looked for in works of reference outside of the pharmacopoeia. It is to be hoped that this matter will be well considered and that the present restrictions will be removed at the next Convention.

The question has often been raised, why did the Committee of Revision not introduce a table of doses in the pharmacopoeia? And it has been answered at various times, more or less completely, sometimes at great length. This may be done more briefly, as follows: Doses of medicines can and should be determined on and authorized only by medical men, who are competent to judge of their effects. This work cannot be undertaken by pharmacists. As long as the medical colleges, societies and associations do not authorize their delegates to the Convention, and their representatives, if they have any, in the Committee of Revision, to vote for the insertion of doses, none of them would feel justified in consenting to it, as there is a deep-seated impression abroad, that the establishment of an official table of doses would place a dangerous weapon into the hands of unscrupulous persons, and might involve many physicians in suits for damages. All efforts, therefore, in favor of the introduction of doses into the pharmacopoeia should be directed to the medical profession, and no blame for their omis-

sion should be attached to the Committee of Revision, which is powerless in the matter. It is suggested that a proposition be made to the medical profession, probably best to its representative body, the American Medical Association, to sanction a table of doses, prepared by a committee of therapeutic experts, to be printed in the pharmacopoeia, with the distinct announcement that the doses given are the average ones to produce the ordinary expected effects, but that every physician has the right to use larger or smaller doses, whenever such may, in his judgment, be required.

VIII. THE REVISION OF A PHARMACOPOEIA.

is a work which must, necessarily, differ according to circumstances. There are several modern pharmacopoeias which have undergone no thorough revision in many years, owing to the comparatively stationary or conservative character of materia medica and pharmacy in their country. These will, however, soon be compelled to take example by the more progressive ones which are kept, as far as practicable, on a level with the progress of therapeutics. Naturally, the methods employed in carrying on the revision of a pharmacopoeia depend, in a great measure, upon the extent to which the revision is to be carried, and upon the complexion of the Committee of Revision. If the committee, as in Russia, consists practically of one man endowed with proper authority, the task is comparatively easy. With an increase of the number of revisers, more particularly if they live in different places and have to carry on most of their work by correspondence, the difficulties increase. Previous to the sixth revision of the U. S. P. (1880) the majority of the Committee of Revision resided at Philadelphia, or, at least, the sessions of the committee were held in that city. Beginning with the pharmacopoeia of 1880, however, the committee was made so large (25 members in 1880, 26 in 1890) that frequent personal meetings became impracticable and the work had to be done, almost entirely, by correspondence. As it is not generally known how this correspondence was carried on and in what manner the committee operated to attain a final result, the following report will not be unwelcome, as it may afford hints to others desirous of carrying on committee work by correspondence, or may elicit suggestions embodying improvements. The report will refer chiefly to the operations of the committee elected in 1890. It will not dwell at length upon matters which have already been mentioned in the preface of the Pharmacopoeia (1890), pg. xxix. to xxxviii.

At the meeting of the Committee which was held at Washington immediately after the Convention, it was, among other things, resolved that correspondence and voting on motions was to be carried on by circulars. Fourteen votes should be required to carry any motion (these were subsequently reduced to twelve, after the death of two

members), and a period of at least fourteen days was to elapse between the sending out of voting sheets and the announcement of a vote, in order to give every member a chance of forwarding his vote in proper time. It may, however, be stated right here, that no advantage was taken in any case of the non-arrival of a vote within the stipulated limit of fourteen days. If it was known that one or more members were absent from home, the time was extended, or steps taken to reach them. In some cases the vote, though legitimately carried, was declared informal, in order to give members known to be interested in a subject and who could not be reached in time, an opportunity of being heard. The guiding principle throughout was this, that no member who desired to argue or to vote on a subject should, by any parliamentary proceeding, be prevented from doing so, until all were ready to decide the matter by a vote. Even then it happened occasionally that an important point was raised in the voting sheet of a member, which rendered it incumbent on the chairman to communicate it to the other members, so that they might, if they wished, call for a new vote. It was understood that if any member did not send in his vote within fourteen days, and did not ask the chairman for delay, unless absent from home, or otherwise unable to respond, he was supposed to have at least no objection to the motion offered. No motion, however, was deemed actually carried, unless there were fourteen (afterward twelve) affirmative votes received by mail. Since it would have involved endless delay in the administration of details in the hands of the chairman, to secure a mover and second to any motion which the chairman desired to bring before the committee, authority was given to the chairman to originate a motion himself and to have it put to a vote. This was a most essential feature, and one that expedited the work most materially. Here it might be appropriate also to speak of the manner of carrying on the correspondence. This was effected by the aid of the well-known copying process (hectograph, etc.). Each circular or communication for distribution was first written, then from 40 to 80 (in some cases over 100) copies printed. Sets of printed envelopes bearing the addresses of the members of the committee were kept by the chairman, and envelopes bearing the chairman's address had been furnished to every member. After a circular of, say, 10 folio pages (involving from 400 to 800 separate prints) had been printed it was "assembled," the necessary number of copies put in the envelopes for mailing, and the remainder filed away for future use. In connection with all circulars containing a motion or some propositions to be voted on, a separate voting sheet was sent, on which were briefly recapitulated the several points involved, and on which the member to whom it was addressed was to write his vote ("aye" or "no"), with any remarks he might wish to offer, together with the date and his signature. This

sheet he was to mail back, without delay, to the chairman. In some cases the vote was to be rendered by postal cards, inclosed with the circular and bearing the chairman's address. It is, of course, always advisable to secure prompt responses by saving to the correspondents as much of their time as possible. The total number of circulars issued up to the end of the year 1894 is 264, comprising 1,282 folio pages. Including special circulars to sub-committees, duplicate issues and voting sheets, this represents about 72,000 separate sheets printed by hand.

Each member of the committee was provided with large blank or scrap books, one for mounting therein the text of the U. S. P. of 1880 (cut from a copy printed on one side of the paper only), with the corresponding portions of the text of the "Digest of Criticisms," and the other for the filing of circulars. Each article of the pharmacopoeia with the corresponding part of the "Digest" was also mounted upon a separate sheet of writing paper, and the whole then divided into sections corresponding to the topics assigned to each sub-committee mentioned below. Each section of sheets was forwarded to the chairman of the sub-committee, who looked after the proper circulation of the sheets among his colleagues, who thus were enabled to read the comments and suggestions for improvements, etc., which each of them made in his turn. In some of the sub-committees these sheets circulated two or three times; in others this was unnecessary. As soon as any portion of the completed work of a sub-committee reached the general chairman, the latter caused it to be copied and circulated among the members of the Committee of Revision for examination and criticism. Some portions had to be submitted repeatedly before an agreement could be arrived at. Whatever discrepancies appeared between the results arrived at by different sub-committees were further discussed until finally the matters were decided either by a unanimous agreement or by a majority vote. As all these matters had to go through the hands of the general chairman, and were attended to with as little delay as possible, a satisfactory harmony was established and maintained throughout the work.

COMMITTEES OF THE U. S. P.

The chairman was also authorized to appoint all committees, except that on Finance, which was elected from among nominees presented by a Committee on Nomination, consisting of three members, including the chairman. After a general plan for carrying on the work of revision had been presented by the chairman, the following Sub-Committees were appointed:

1. Sub-Committee on Therapeutics, comprising all the practicing physicians on the committee. Every member of the committee possessing the degree of M. D. was asked to state whether he desired to be regarded as coming under that category. A few of these members, thereupon, expressed their wish to remain excluded from the

list. This sub-committee had charge of all therapeutic questions which arose from time to time. It was understood that it was to have the preponderance in decision over the admission of new drugs and preparations in the Pharm., even when apparently outvoted by the other members. Concerning expurgations, its advice was also sought, and in many cases accepted, though in this case the reports of other members regarding the actual use or disuse of a preparation were generally sufficient to decide the case.

2. Sub-Committee on Botany and Pharmacognosy. This had charge of all botanical matters, including the botanical nomenclature and the descriptions of vegetable and animal drugs.

3. Sub-Committee on Reagents and Inorganic Chemicals. This committee was the first to make a report, which referred to volumetric solutions. The revision of the constants of nature, reactions of identity and tests of purity and strength of the subjects assigned to this Sub-Committee involved a large amount of experimental work, the results of which are given in a commentary accompanying the members' papers. In 1892 this Sub-Committee published a small pamphlet containing the text of the Reagents and Volumetric solutions proposed for the U. S. P., which assisted materially in expediting the further work of this and other sub-committees.

4. Sub-Committee on Acids, Chemical Solutions and a few special Articles. The proper strength and specific gravity of certain mineral acids was a subject which received close attention on the part of the General Committee (see U. S. P. 1890, pg. xxxv). After a decision on this subject had been arrived at, the Sub-Committee was enabled to revise the formulas submitted to it.

5. Sub-Committee on Proximate Principles and other Organic Chemicals. The revision of the text of the organic chemicals, particularly that of the alkaloids, glucosides and indifferent principles, also involved much original work, particularly as regards solubilities, melting points and tests of identity. This Sub-Committee received valuable assistance from several experts, not members of the Revision Committee, as well as from several manufacturing houses.

6. Sub-Committee on Assay Processes. This had charge of the study of the assay processes of opium, cinchona and nux vomica, as well as those proposed for other drugs. Much work was bestowed, particularly on the assay of opium, the assistance of a number of experts outside of the Revision Committee being also secured.

7. Sub-Committee on Fluid and Solid Extracts, Tinctures, Wines and their Menstrua. Before this and several other Sub-Committees could propose actual working formulas, it was necessary to fix the strength of the galenical preparations in accordance with the instructions of the Convention, namely, by metric weight and measure. As it was in many cases impossible to convert the formulas of the previous pharmacopoeia (of 1880), in which the quantities were given in "parts by weight," into the absolutely corresponding terms of weight and measure in the metric system, without complicating the new formulas with inconvenient fractions, the several quantities had to be rounded off, in such a manner, however, that the strength of the preparations should be altered as little as possible. At the same time certain preparations were designedly more or less altered, for reasons which are given in the preface to the U. S. P.

8. Sub-Committee on Fixed and Volatile Oils. A comparison of the text of these articles in the new pharmacopoeia with that in the preceding one, or with that in other pharmacopoeias, will show that the pharmacist is now for the first time put in possession of official data sufficing in most cases for determining the character and purity of these rather variable commercial products.

9. Sub-Committee on Cerates, Ointments, Plasters, Liniments, Papers and Glycerites.

10. Sub-Committee on Syrups and Aromatic Waters. The introduction of the alternative process of preparing a number of syrups by cold percolation involved many experiments, but is believed to have met with general approval.

11. Sub-Committee on Abstracts and Emulsions. This was appointed at a later period.

12. Sub-Committee on Unassigned Articles.

13. Sub-Committee on Nomenclature. Although the subject of nomenclature was in charge of a special committee, yet many of the other sub-committees, in the course of their work, had occasion to propose modifications in nomenclature.

14. Sub-Committee on Weights, Measures and Pharmacopoeial Tables.

Before these different sub-committees were constituted, the members of the General Committee were requested to indicate their preferences. In this way it was possible to assign each work to members who were thoroughly familiar with the subject.

The correspondence between the members themselves, the members and the general chairman and the official circulars sent out by the latter during the period of the actual revision contain a large mass of valuable material, which would make interesting reading, a large portion of which is, however, superseded either by papers on cer-

tain subjects published by their authors or by being incorporated in the pharmacopoeia, or by referring to matters which were, after investigation, dropped.

As one sub-committee after another completed its work, wholly or in part, the general chairman wrote out the text of each article in the form in which it was intended to be printed on paper of uniform size, particular care being devoted to uniformity in general treatment, in the sequences of the several paragraphs, in the processes and methods involved, and in the language employed. Any inequalities and discrepancies which were discovered in the work of the several sub-committees had to be eliminated, often requiring a matter to be subjected to a new vote. In the more important departments, the corresponding sheets of the manuscript were submitted to members of the corresponding sub-committees for examination. All missing links, of which an unexpected number is liable to be discovered when heterogeneous parts are joined together, had to be supplied, often involving numerous experiments.

When the manuscript was finally practically completed, steps were taken for its publication. At the request of the chairman, the Finance Committee took the matter under consideration, as the result of which a resolution was offered and carried that a Publication Committee be created, to consist of the Chairman of the Committee of Revision and four other members to be appointed by him; that this committee should be charged with the duty of attending to all business matters connected with the publication and sale of the pharmacopoeia; that it should be authorized to make contracts for printing, electrotyping, binding and any other work which may be required to make a merchantable book; and that the action of the Publication Committee should be subject to approval by the Committee of Revision. Accordingly the Publication Committee was constituted (see back of title page of U. S. P.). It was determined in the outset that the committee would not consent to release control over the work, and also that the mechanical preparation of the book and the agency for its sale should form the subjects of two separate contracts. Invitations were sent out to a number of printing houses of repute, to submit bids for composition work, printing and binding, on the basis of detailed specifications prepared by the Publication Committee. The received bids were opened on Dec. 30, 1892, and the contract was awarded to the J. B. Lippincott Co. of Philadelphia. Subsequently a number of publishing houses were invited to submit bids for the sale and agency of the work. As a result of this compe-

tion, the contract was awarded to Messrs. P. Blakiston, Son & Co. of Philadelphia. It may be added for the comfort of those who proposed in the Pharmacopoeial Convention of 1890 the creation of a Business Committee, separate from the Revision Committee, that no hitch has at any time occurred in the business arrangements, nor is likely to occur under the rules which have been laid down.

The contract for composition work, etc., contained detailed specifications regarding the number of galley proofs, revises and plate proofs to be supplied. Each member of the Committee of Revision and such other persons as were to be designated by the Chairman received two copies of every proof directly, by mail, from the printing office, the Chairman receiving five or more, as was necessary. Each sheet of proof was dated, and the members and others were instructed, after reading it and correcting any errors or proposing alterations, to mail one copy without delay to the Chairman, so that it would reach him within a fixed number of days. If no proof was sent by any member within this time, it was to be understood that no alterations were found necessary. Upon arrival of the several proofs, the Chairman, who had already read his own, examined each one, and made such other changes in his set as were found necessary. This required much care and constant reference to other parts of the work, either already in type or still in manuscript, because a change in one place often necessitated one or more changes elsewhere. Sometimes the alterations proposed by different proof-readers were practically irreconcilable, thus throwing the responsibility of a final decision upon the Chairman, though in a few particularly important cases the point at issue was once more submitted to a vote. When a set of galley proofs had finally been fully corrected one copy was sent by the Chairman to the printer and another filed for reference. The revises were sent by the printer in the shape of page proofs to all the members, as in the case of the galley proofs, and the members mailed copies of those on which they had noted corrections to the Chairman. The latter combined these, so far as possible, with his own, and forwarded a copy to the printer, who, after making the necessary changes, caused the several pages to be electrotyped.

Plate proofs were then furnished to the Chairman and to such of the other members as needed them for reference. The time required for putting the whole text into type was eighteen weeks, and nearly 30,000 sheets of the several kinds of proof were mailed during this time from the printing office to the several addresses.

It might seem as if the writer's work had received more prominent treatment in this report than that of the other members of the Committee. If this is so, it could not well be helped, since the transactions of a body, such as the Committee of Revision, are best seen when viewed from the central point. But it should be distinctly understood that, whatever success has attended the enter-

prise, was mainly due, on the one hand, to the conscientious, unwearying and unstinted labor of the members having the important subdivisions of the work in charge, and, on the other hand, to the spirit of harmony which prevailed throughout, and which forms a most pleasant remembrance to all who were associated in the work.

RESEARCH COMMITTEES.

The Committee of Revision, since the publication of the U. S. P., has not been idle, but has set out to prepare for the next revision.

Early in 1894 it was decided to appoint a number of Research Committees, to be equipped with funds, as may be required, for the purpose of carrying on investigations on subjects having a bearing on the pharmacopoeia. The Research Committees so far created are the following:

Research Committee A.—To inquire into the feasibility of devising practical methods of assay for drugs containing no sharply defined proximate principles capable of being readily separated in a sufficiently pure state (such as Ergot, Digitalis, Rhubarb, etc.). This committee is at work and will furnish reports from time to time. Chairman, Dr. W. M. Mew of Washington, D. C.

Research Committee B.—Revision of the descriptions and tests of inorganic chemicals, including salts of inorganic bases with organic acids; revision of the volumetric assays of the U. S. P.; study of the proper limits of purity or strength of the chemicals now official or likely to become so hereafter. This committee has already published papers on the following subjects (all the results of researches of its chairman, Prof. Charles O. Curtman of St. Louis): 1, on "The Arsenic Tests of the U. S. Pharm.," 2, on "The Volumetric Determination of Liquor Plumbi Subacetatis," 3, on "Artificial Manganese Dioxide," 4, on "The Hydration of Calcium Bromide and Iodide," 5, on "The Quality of Potassium Iodide of the Market," 6, on "Potassium Bromide, sold as 'U. S. P.,'" 7, on "Bromine from American Sources," 8, on "The Purity of Iodine Sold as 'Resublimed.'"

Research Committee C.—To inquire into the feasibility of incorporating into the U. S. P. methods of identifying such drugs, as may be found to permit it, in a powdered condition. Chairman, Dr. H. H. Rusby of New York. This committee has also been organized and is engaged upon work.

Research Committee D.—To revise the descriptions and tests of the organic chemicals. This committee, of which the writer is chairman, will make its first report some time during the coming year.

Research Committee E.—To determine the most suitable menstrua, and the best processes for preparing, and adjusting the strength of, Extracts, Fluid Extracts, and kindred preparations. Chairman, Professor Joseph P. Remington of Philadelphia.

Other Research Committees are soon to be organized. The chairmen of those already established have been purposely announced above, so that any reader of this paper who desires to offer any suggestions regarding the subjects undertaken by them may know whom to address.

The leading educational feature of THE PHARMACEUTICAL ERA for 1895 will be A SERIES OF ESSAYS, to be published in weekly portions covering a complete lecture course in pharmacy, by recognized authorities:

TO SECURE THIS LECTURE COURSE complete it is only necessary to subscribe for THE PHARMACEUTICAL ERA for 1895. Orders for subscription should be sent in promptly to insure the complete set. The subscription price is \$2.00 a year postpaid, for the United States, Canada and Mexico; to foreign countries in the Postal Union an additional charge of \$1.00 for postage. Address all orders direct to the publishers.

D. O. HAYNES & CO., 106 Fulton St., NEW YORK.